

## **Beware of the Mad Hatter.**

### **Mental Illness Stigma and Healthcare Utilisation for Mental Problems.**

Inauguraldissertation

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vorgelegt von

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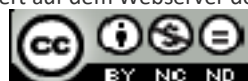
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Gutachterinnen

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Von der Philosophisch-humanwissenschaftlichen Fakultät der Universität Bern auf Antrag von Prof. Dr. Claudia Maria Roebers (Hauptgutachterin) und Prof. Dr. Frauke Schultze-Lutter (Zweitgutachterin) angenommen.

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Die Dekanin: Prof. Dr. Tina Hascher

The present PhD thesis entails the following studies as existent on 1<sup>st</sup> September 2017:

### **Study 1**

Schnyder, N., Panczak, R., Groth, N., & Schultze-Lutter, F. (2017). Association between mental health-related stigma and active help-seeking: systematic review and meta-analysis. *The British Journal of Psychiatry*, 210(4), 261-268.

Considered Journal: *The British Journal of Psychiatry*

Status: accepted for publication (7<sup>th</sup> September 2016)

### **Study 2**

Schnyder, N., Michel, C., Panczak, R., Ochsenbein, S., Schimmelmann, B. G., & Schultze-Lutter, F. (*submitted*). Influence of knowledge about causes of mental disorders and stigma related to mental disorders on healthcare utilisation in a general population sample: a structural equation model.

Considered Journal: *Psychological Medicine*

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### **Abstract**

Mental disorders cause high individual and societal costs and burden. Although they are treatable and potentially preventable, healthcare utilisation is often delayed or completely absent. Important barriers of healthcare utilisation are mental illness related stigmatising attitudes. Stigma is not a unitary concept but covers several aspects whose single contributions to delay or absence of healthcare utilisation are so far unclear. The first aim of this PhD thesis was to examine associations between different aspects of stigma and healthcare utilisation in a meta-analysis, providing more robust and aggregated evidence to the growing body of literature in this field. Stigmatising attitudes are not independent of each other and are influenced by other factors, an important one being knowledge about signs and treatment of mental disorders, i.e. mental health literacy (MHL). In particular persons' causal or etiological explanations for a mental illness were associated with stigmatising attitudes before. The second aim of this PhD thesis was to examine associations between persons' causal explanations for mental disorders and stigma, and between stigma and healthcare utilisation in the general population. Using structural equation modelling and a comprehensive set of variables in order to elucidate complex relations between the latent constructs, makes this work stand out from majority of previous research. The main findings of this PhD will be discussed in the light of earlier studies and social psychological research and theories. Furthermore, suggestions for future studies and for campaigns promoting healthcare utilisation via improving MHL and stigmatising attitudes will be derived.

*Imagine the following: In the last 6 month, a good friend of yours seems changed. He shuts himself out and avoids contact to everybody. In the rare moments you can talk to him, one topic dominates the conversation: the question if some people can read minds of other people. Your friend does not think about anything else anymore. He neglects himself and looks more and more dishevelled. At work, he seems confused and suddenly makes many mistakes. His boss already wanted to talk to him about his problems.*

*Finally, your friend stays unexcused away from work for one week. When he returns, he seems frightened and haunted. He is now certain that other people can not only read the mind of others, but that they can also directly influence thinking. His thoughts are disturbed all the time. He can hear other people talking to him and giving him orders. Sometimes, these people would even talk about him and laugh at him. It is worst in his flat where he feels threatened and frightened. That's why he didn't go home for the last week but stayed hidden in hotel rooms, being afraid to go out.*

What do you think is wrong with your friend? What do you think caused his condition? Is it a disease of the brain? Or was his work too stressful? Do you think his condition makes him unpredictable? Or even dangerous? Would you let your friend babysit your children anymore? Do you think he should seek help with a psychologist or psychiatrist? Or maybe with a homeopath? Do you think that seeking help would make him feel better?

## Introduction

Approximately every second person develops a mental or substance use disorder in the course of their lives (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005; Kessler et al., 2007). Although mental disorders are rarely a direct cause of premature death, the personal and societal burden associated with them is high. Since the World Development Report by the World Bank in 1993, the relative burden related to disease morbidity rather than disease mortality came globally into focus. Disease morbidity is commonly measured as years lived with disability (YLD) or disability adjusted life years (DALYs). Latter is expressed by the cumulative number of years of life lost due to disability, ill-health or early death (Murray, 1994; Murray & Lopez, 1994). At 7.4%, mental and substance use disorders are the fifth leading cause of DALYs and, at 22.9%, the

leading cause of YLDs worldwide (Whiteford et al., 2013). Beside the high personal costs delineated by YLD and DALYs, direct healthcare, direct non-medical and indirect costs (such as production losses) contribute to the immense societal costs of mental disorders of € 453.4 billion in Europe in 2010 (Gustavsson et al., 2011). In the wake of the change of focus from mortality to morbidity, efforts to improve mental health have been given increasing emphasis worldwide (Patel et al., 2008).

Mental disorders are treatable and potentially preventable, and psychotherapy (Gu, Strauss, Bond, & Cavanagh, 2015; Hofmann & Smits, 2008), pharmacotherapy (Arroll et al., 2009; Anderson et al., 2008; Goodwin et al., 2009; Leucht et al., 2013) and especially their combination (Cuijpers, Sijbrani, Koole, Andersson, Beekman, & Reynolds, 2014; Fournier, DeRubeis, Hollon, Dimidjian, Amsterdam, Moore, & Johnson, 2010; Kirsch, Deacon, Huedo-Medina, Scoboria, Moore, & Johnson, 2008) are effective to improve patients mental health. Yet, many persons do not or only with significant delay seek help for mental problems and disorders (Wang et al., 2007; Wittchen et al., 2011). In Europe where disorders of the brain are the largest contributor to DALYs, despite good access to care and much efforts to improve help-seeking, no indications of improved care and treatment between 2005 and 2010 were found with more than two thirds of all cases not receiving any treatment; this indicates a considerable level of unmet needs (Wittchen et al., 2011).

An unmet need, however, can only be assumed in someone actually needing something. In studies aiming at finding reasons for the lack of or delay in healthcare utilisation, a *need for treatment* is commonly defined by meeting criteria for a mental disorder. This definition has been debated. Some opponents of this definition argued that people who do not meet diagnostic criteria still have legitimate reasons to seek treatment, for example, for subthreshold symptoms or psychological distress, and that the definition of “need” by

meeting criteria for a mental disorder might underestimate the actual need for treatment (e.g. Harris, Diminic, Burgess, Carstensen, Steward, Pirkis, & Whiteford, 2014; Pagura, Katz, Mojtabai, Druss, Cox, & Sareen, 2011). Others argued that many people remit without treatment and that this definition of “need” might therefore overestimate the need for treatment (e.g. Sareen, Henriksen, Stein, Afifi, Lix, & Enns, 2013). In a recent study, it was argued against the overestimation assumption that even persons who spontaneously remit from their mental disorder demonstrate lower quality of life than healthy individuals (Wang, Henriksen, ten Have, de Graaf, Stein, Enns, & Sareen, 2017). This line of argument assumes that persons treated for mental disorder demonstrate a quality of life as good as that of healthy individuals; this, however does not seem to be the case for many mental disorders including depression (IsHak et al., 2011) and schizophrenia (Bobes, Garcia-Portilla, Bascaran, Saiz, & Bouzoño, 2007).

In the discussion about unmet need for treatment, it is also important to specify the kind of contact point and of treatment that is referred to as meeting the need for treatment. While a combination of medication and psychotherapy is considered to be good clinical practice by professionals (Cuijpers et al., 2014; Fournier et al., 2010; Kirsch et al., 2008), lay-persons from the general population prefer psychotherapy over medication (Angermeyer, Matschinger, & Schomerus, 2013) or might even recommend alternative treatments (Angermeyer et al., 2013). The source and duration of help-seeking is important to determine as well. In a wider definition of meeting the need for treatment, persons might only ones seek help from a general practitioner that prescribed a helpful medication. In a narrower definition of meeting the need for treatment, persons might regularly receive psychotherapy and combine it with medication. Of course, everything in between and beyond, like the admission to a psychiatric hospital, is possible too. Furthermore, with regard to the outcome “help-seeking”, it might be important to distinguish between hypothetical help-seeking intentions and actual help-seeking. This view is supported by the



discrepancy between the above studies on unmet needs and reported rates on help-seeking intentions that are by far higher (Lally, ó Conghaile, Quigley, Bainbridge, & McDonald, 2013).

However, beyond the discussion around definitions, to address the challenge of promoting help-seeking for mental problems or disorders, reasons why individuals with mental health problems do not or do only reluctantly seek help have to be addressed.

Several barriers to healthcare utilisation have been suggested in past years, including:

- a low perceived need for help (Andrade et al., 2014; Mojtabai et al., 2011),
- the preference to handle the problem on one's own (Adler, Britt, Riviere, Kim, & Thomas, 2015; Chen, Crum, Martins, Kaufmann, Strain, & Mojtabai, 2013; Gulliver, Griffiths, & Christenssens, 2010; Mojtabai et al., 2011),
- financial barriers such as not being able to afford the treatment (Chen et al., 2013),
- poor knowledge about signs and treatment of mental disorders, i.e. low *mental health literacy* (MHL) (Gulliver et al., 2010), and
- negative or stigmatising attitudes towards individuals with a mental illness or towards help-seeking itself (further referred to as *stigma*) (Gulliver et al., 2010; Mojtabai et al., 2011; Clement et al., 2015).

Stigma is generally considered as one of the most influential barriers to mental healthcare utilisation and, therefore, is targeted in public health campaigns promoting help-seeking (Corrigan, Michaels, & Morris, 2015; Jorm, Christensen, & Griffiths, 2005; Mehta et al., 2015; Thornicroft et al., 2016). Yet, stigma is not a unitary concept but covers several aspects whose single contributions to delay or absence of healthcare utilisation are so far unclear.

Against this background, the first aim of this PhD thesis was to examine the associations between different types of stigma and healthcare utilisation in a meta-analysis

(Study 1). Results of this meta-analysis might help improve public health campaigns that target on facilitating (early) healthcare utilisation. Although several (systematic) reviews on this topic had been conducted before (Clement et al., 2015; Corrigan, 2004; Corrigan, Druss, & Perlick, 2014; Gary, 2009; Schomerus & Angermeyer, 2008; Sharp, Fear, Rona, Wessley, Greenberg, Jones, & Goodwin, 2015), a meta-analysis was never carried out. As will be explained in more detail below, this meta-analysis also addressed some conceptual and methodological flaws that former review articles presented. As little as being a unitary concept, stigma is also not alone-standing concept but interacts with a number of variables – also in its effects on mental healthcare utilisation. An important factor influencing persons stigmatising attitudes is MHL, in particular persons' causal or etiological explanations for a mental illness. Therefore, the second aim of this PhD thesis was to examine associations between persons' causal explanations for mental disorders and stigma, and between stigma and healthcare utilisation in the general population (Study 2). Using structural equation modelling (SEM) and a comprehensive set of variables in order to elucidate complex relations between the latent constructs, makes this work stand out from majority of previous research.

Overall, this PhD thesis makes a meaningful contribution to the understanding of mental illness related stigma, one of the most important barriers for healthcare utilisation, by providing more robust and aggregated evidence to the growing body of literature in this field. Furthermore, the analytical method (SEM) of study 2 helps to disentangle the complex interrelation between causal explanations and different aspects of stigma, and between stigma and healthcare utilisation. The insight provided by both studies will help to adapt public health campaigns aiming to promote healthcare utilisation for mental problems via reducing stigmatising attitudes. Furthermore, it might support clinicians' awareness of stigma as a barrier for treatment, and in targeting psychoeducation to less stigmatised causal explanations.

## **Defining Mental Illness Related Stigma**

In the context of mental health and healthcare utilisation, the term stigma is understood as negative public and personal attitudes and behavioural responses towards persons with a mental illness and towards help-seeking for mental disorders whereby stigmatising attitudes are formed by cognition and affect and have a behavioural component (Dividio, Hewstone, Glick, & Esses, 2010; Fiske, 1998). Mental illness related stigma is commonly assessed with a variety of instruments whose correspondence is frequently unclear (Study 1). Although the term stigma is often used as umbrella term in the literature, three to four different, yet related main categories of mental illness related stigma can be distinguished, which are associated with healthcare utilisation (Study 1 and Study 2):

- public stigma (divided into perceived public stigma, PublicS, and personal stigma, PersonS),
- self-stigma (SelfS), and
- stigmatising attitudes towards mental health professionals or mental health treatment institutions (HelpA).

The broader concept of public stigma is defined as the perceptions of members of the general population about a person suffering from a mental illness and involves two distinct sub-categories: PublicS, the individual's perception of public stigma; and PersonS, the individual's own stigmatising attitudes towards a person with a mental illness (Dietrich, Mergl, & Rummel-Kluge, 2014; Griffith, Christensen, & Jorm, 2008; Rüsch & Corrigan, 2013). Thinking back to the person described in the introductory vignette, these two types of stigmata could differentially show in someone reporting that the majority of the community (PublicS) but not him-/herself (PersonS) would consider the depicted person as unpredictable. While this difference in reported attitudes might be real, it might also be related to response bias in PersonS, i.e. to a tendency to depict oneself in a socially desired,

tolerant way. This illustrates why PublicS and PersonS should be explored separately when conducting research on public stigma, and why the endorsement of PublicS was found to be substantially higher than that of PersonS (Dietrich et al., 2014; Eisenberg, Downs, Golberstein, & Zivin, 2009). Another type of stigma, SelfS, occurs when individuals with a mental illness endorse public's stigmatising attitudes as self-relevant and turn them against themselves, or when they believe to be a devaluated member of society (Corrigan, Watson, & Barr, 2006; Livingston & Boyd, 2010; Rüsch & Corrigan, 2013). With regard to the case vignette, SelfS would occur when the depicted person started to consider himself as unpredictable due to his mental state. HelpA, in turn, is less directly related to persons with mental disorders but defined by stigmatising attitudes towards help-seeking for mental problems and, thus, includes negative attitudes towards mental healthcare professionals or institutions, confidence that the offered help will be of assistance, and own emotional evaluations related to help-seeking, such as feeling embarrassed to be in need of help (Fischer & Turner, 1970). Persons with negative HelpA might think that mental healthcare professionals have mental problems themselves, that they cannot help, or would even further harm a person like the one in the vignette.

### **The cognitive, affective and behavioural components of mental illness stigma.**

Stigmatising attitudes have a strong cognitive component that not only involve the so far mainly described cognitive-affective evaluations of a person with a mental illness or of help-seeking but also a cognitive-behavioural evaluation of individuals with mental illness or towards help-seeking (Lee, Laurent, Wykes, Andrey, Bourassa, & McKibbin, 2014; Schomerus, Matschinger, & Angermeyer, 2014) or even behavioural responses (Cuddy, Fiske, & Glick, 2007). In the context of mental illness related stigma, Link (1987) addressed this issue and developed the 'wish for social distance' (WSD) scale that measures the cognitive-behavioural aspect of PersonS. Persons with a high WSD might not

want the person in the vignette to babysit their children, to have him as a co-worker or to introduce him as a potential partner to their best friend (PersonS). Corresponding examples for the cognitive-behavioural aspects of PublicS, SelfS and HelpA involve that persons might think that majority of their community would not let a person with a mental illness babysit their children (PublicS), that the person in the vignette might think of himself that he would not be capable of babysit children (SelfS) or the perception that seeking help will not improve the person's ability to babysit, i.e., that help-seeking will likely be useless (HelpA). Table 1 summarises the different aspects and components of stigma.

The cognitive-affective and cognitive-behavioural aspects of stigmatising attitudes are relatively easy to assess in representative population based research using questionnaires or interviews, and are well studied. Discriminating structural conditions and stigmatising personal actual behaviours are more difficult to assess in representative population based research and are less well studied. Historical studies on stigmatising personal behaviours resembling current measures of WSD suggested that employers are less likely to hire persons with a history of mental illness (Bordieri & Drehmer, 1986), house owners are less likely to rent their flat to a person with a mental illness (Page, 1977), and persons with a mental illness are more likely to be falsely arrested for a criminal offense than persons without mental illness (Hunt, MacKinnon, & Michels, 1974). Discriminating structural conditions show, among others, that psychiatric hospitals have traditionally been built in the outskirts of cities or the countryside, while somatic hospitals are commonly located in city centres. Although it is difficult to retrospectively evaluate if such structural discrimination is due to discriminatory behaviour of city planners, it certainly does not benefit the social inclusion of psychiatric patients. Because actual stigmatising behaviours and structural discrimination are difficult to validly observe in community surveys and our focus was on the general population, the emphasis of this PhD thesis was on the cognitive-affective and the cognitive-behavioural components of stigmatising attitudes. With respect

to the outcome variable of Study 1 and Study 2, “help-seeking for mental problems”, however, the focus was on the reported actual behaviour, i.e., healthcare utilisation, rather than on help-seeking intentions that might never be put into action.

### **Interrelation of different stigmatising attitudes and components.**

Although the different components and aspects of stigmatising attitudes are distinct, they are nevertheless interrelated. Studies suggest that PublicS influences SelfS, PersonS, and HelpA (Evans-Lacko, Brohan, Mojtabai, & Thornicroft, 2012; Jennings et al., 2015) and that media shapes public’s perceptions and stigmatising attitudes (Coverdale, Nairn, & Claasen, 2002; Francis, 2001). Media reports are biased towards the rather rare occasions of violent or criminal acts committed by persons with a mental disorder (Schomerus, Stolzenburg, Bauch, Speerforck, Janowitz, & Angermeyer, 2017), and movies often illustrate individuals with a mental illness in an unfavourable and inaccurate way (Klin & Lemish, 2008; Wahl, Wood, & Richards, 2011) as dangerous or unpredictable. Because media is the most significant source of information about mental illness for most persons (Coverdale et al., 2002), individuals with a mental illness might therefore apply publicly shared stigmatising attitudes (PublicS) to themselves and consider themselves as unpredictable (SelfS), while others might feel awkward when sitting next to a person they know or assume to suffer from a mental illness for fear that this person might do something unpredictable or even dangerous (PersonS). Furthermore, aspects of PersonS can influence aspects of HelpA (Schomerus, Matschinger, & Angermeyer, 2009). Persons with a strong WSD less likely reported own help-seeking intentions in the hypothetical case of suffering from mental problems themselves (Schomerus et al., 2009). This indicates that persons with a strong WSD might avoid either the increased possibility of meeting other psychiatric patients that healthcare utilisation might bring about or the social distance they might fear others will keep once they learn about them being a psychiatric patient and

associate them with this stigmatised group. Furthermore, the cognitive-affective components of stigmatising attitudes seem to influence the cognitive-behavioural components (Lee et al., 2014; Schomerus et al., 2014) in the sense that perceiving someone with a mental illness as unpredictable, i.e., PersonS, increases WSD. Study 2 paid credit to these complex interrelations between the types of stigma.

### **Defining Mental Health Literacy (MHL)**

Stigmatising attitudes are not only dependent of each other but are also influenced by other factors, an important one MHL. The concept of MHL was first introduced by Jorm and colleagues (1997) and is defined as “knowledge and beliefs about mental disorders which aid their recognition, management and prevention” (p. 183). MHL is commonly assessed in interview- or questionnaire-surveys, starting with a case vignette describing a person with a mental illness (similar to the introductory one above) and followed by questions about the possible type of disorder, its cause and the best contact point to receive help for it. Publics’ MHL seems to have improved over the last years and have moved closer to the understanding of (mental health) professionals. Persons better recognise mental disorders, more often assume biogenetic causal explanations, and more often recommend mental health professionals as a source of help (Angermeyer, Holzinger, & Matschinger, 2009; Angermeyer, Matschinger, & Schomerus, 2017; Jorm, Christensen, & Griffiths, 2006; Reavley & Jorm, 2012). These improvements were associated with the success of public health campaigns in Australia (Reavley & Jorm, 2012) but not in the United Kindom (UK) (Evans-Lacko, Henderson, & Thornicroft, 2013). The campaign in Australia took place over a much longer time period and improvements in knowledge were surveyed over a longer time period than in the UK, which might be an explanation for the missing effect in UK.

It was assumed that improvement in MHL translates to improvement in stigmatising attitudes. But there is growing evidence that this might not be the case (Angermeyer et al., 2013; Angermeyer et al., 2017). Despite an increased readiness to recommend help-seeking from mental health professionals, to endorse biogenetic causation for mental disorder, and to understand mental health and illness as a continuum rather than a clear, dichotomised separation, attitudes towards persons with mental disorders did not change over time or even worsened (Angermeyer et al., 2013; Angermeyer et al., 2017). For example, endorsing continuum beliefs about mental disorder did not decrease negative stereotypes and negative emotional reactions towards persons with mental disorder and only improved WSD to a limited degree (Makowski, Mnich, Angermeyer, & von dem Knesebeck, 2016), and endorsing biogenetic causal explanations was associated with more rather than less stigmatising attitudes towards persons with mental illness (Kvaale, Haslam, & Gottdiener, 2013). Persons endorsing high biogenetic causal explanations showed more treatment pessimism and more negative attitudes towards persons with mental illness, such as perceiving them as being more dangerous (Kvaale et al., 2013). The influence of other causal explanations, such as psychosocial, constitution/personality, or drug/medication abuse related ones, on stigmatising attitudes has rarely been studied, although already in 2008 Jorm and Griffiths suggested that personal weakness (a part of constitution/personality related causal explanations) might be a more important determinant of stigmatising attitudes than biogenetics. However, while commonly the influence of MHL on stigma is studied, a recent study suggested that associations can also run the other way; negative stereotypes and the related fear of persons with mental illness increased psychopharmacological treatment recommendations that might well be regarded as a sign of good MHL (Speerforck, Schomerus, Matschinger, & Angermeyer, 2017). Study 2 condensed this knowledge and examined these complex interrelations between different causal explanations as the component of MHL most likely influencing stigma and stigma



on the one, and between stigma and healthcare utilisation on the other hand using a structural equation model.

### Empirical Studies

This section will summarise the most important findings of this PHD thesis and discuss them in light of the current state of research. Study 1 is a meta-analysis based on peer-reviewed journal articles that were published between January 1990 and July 2015. The studies were identified in three electronic databases using keywords related to mental disorder, stigma and help-seeking. For each of four stigma types (PublicS, PersonS, SelfS and HelpA), we computed separate random-effect meta-analyses based on reported Odds Ratios and 95% Confidence Intervals. Study 2 is based on data of a general population sample from the Canton of Bern and comprehensively examined the interrelation between MHL, stigma and actual healthcare utilisation for mental problems. We applied orthogonal exploratory factor analyses (EFA) to receive uncorrelated factors on whose basis we computed a full structural equation model (SEM) to examine the influence of latent and observed predictor variables on the outcome variable as well as the interrelation of these predictor variables.

#### Study 1:

**Schnyder, N., Panczak, R., Groth, N., & Schultze-Lutter, F. (2017).** Associations between mental health-related stigma and active help-seeking: systematic review and meta-analysis. *The British Journal of Psychiatry*, 210(4), 261-268.

Recent (systematic) review articles (Clement et al., 2015; Corrigan, 2004; Corrigan et al., 2014; Gary, 2009; Schomerus & Angermeyer, 2008; Sharp et al., 2015) reported negative associations between stigma, in particular SelfS and HelpA, and help-seeking. After screening 6805 studies, we included 27 studies in the meta-analyses (see Figure 1 in Study 1). The meta-analysis was able to address and eliminate some methodological and conceptual flaws of above mentioned (systematic) review articles, such as (1) mixing help-seeking intentions and actual help-seeking, i.e. healthcare utilisation, (2) not discriminating

stigma types, (3) mixing different study populations and (4) not calculating pooled effects. The new insight gained by addressing these methodological issues is described in the following.

First, the outcome definition of help-seeking often mixed intended or recommended help-seeking and active healthcare utilisation in earlier reviews. Although intentions and behaviours are closely related according to the theory of planned behaviour (Ajzen, 1991), they are not the same, as even the best intentions might not always be put into action. Our meta-analyses showed that negative PersonS and negative HelpA but not SelfS or PublicS significantly reduced healthcare utilisation (see Figure 2 in Study 1), neither did the additional category general stigma that was used when we were not able to classify the stigma measure in one of the four categories. This indicates that a person's own attitudes are more important in the decision to seek help for mental problems than the perceived attitudes of others.

Second, many earlier reviews did not distinguish between the different stigma types but rather used stigma as an umbrella term. Along with other studies (Eisenberg et al., 2009; Vogt, Fox, & Di Leone, 2014), our meta-analyses underscored the importance of distinguishing the four stigma types as they differentially influence healthcare utilisation.

Third, the effect of stigma on healthcare utilisation was often examined in patient samples, and all (systematic) reviews included both patient and general population samples. To avoid the selection bias towards healthcare utilisation that is inherent to patient samples, our meta-analysis only included general population surveys. Furthermore, experience with the healthcare system and other persons with mental disorders might alter stigmatising attitudes of patient samples who, thus, might not be fully representative for general population samples with less experience with the mental health system. This representativeness is necessary since the practical relevance of studies examining

associations between stigma and help-seeking often lies in optimising campaigns promoting mental health or (early) healthcare utilisation that target the general population.

Fourth, this was the first meta-analysis on this topic and, therefore, the first time that subgroup analysis were able to estimate effects of study characteristics on the associations between stigma and healthcare utilisation. These sensitivity analyses demonstrated that studies with higher response rates and those that used face-to-face rather than questionnaire assessments showed stronger negative effects of stigma on healthcare utilisation (see Figure 3 in Study 1). Furthermore, the inspection of single study effects revealed an association between this two characteristics as studies with face-to-face assessments were more likely than studies with questionnaire assessments to report high response rates.

Overall, Study 1 added more robust and aggregated knowledge to the growing body of literature on associations between mental illness related stigma and healthcare utilisation. Our findings suggest that campaigns promoting healthcare utilisation by reducing stigmatising attitudes should address negative personal attitudes such as HelpA and PersonS. Unfortunately, we were not able to give credit to the entire complexity of mental illness related stigma in this meta-analysis, namely the cognitive-affective and the cognitive-behavioural components and their interrelations, because of the limited number of available studies. Furthermore, although it is often discussed that MHL, especially causal explanations, is an important influencing aspect of stigma, this was not studied so far in a general population sample in relation to healthcare utilisation and could therefore not be included in our meta-analysis. Thus, we addressed both topics in Study 2.

Study 2:

**Schnyder, N.,** Michel, C., Panczak, R., Ochsenbein, S., Schimmelmann, B.G., & Schultze-Lutter, F. (submitted) Influence of knowledge about causes of mental disorders and stigma related to mental disorders on healthcare utilisation in a general population sample: a structural equation model.

Following up on the open questions and issues raised above, Study 2 investigated the influence of causal explanations for mental disorders on stigmatising attitudes, and of stigmatising attitudes on lifetime healthcare utilisation in the described general population sample. According to considerations about the need for treatment (see Introduction), we decided to include all persons who ever sought help for mental problems, regardless of their symptoms. Furthermore, healthcare utilisation included any semi-professional contact point incl. general practitioners because first contact points will often be the gate-keepers to professional help and referral to mental health professionals might dependent on them. The results of this study are based on cross-sectional data of an add-on study to the ‘Bern Epidemiological At-Risk’ (BEAR) study (Schultze-Lutter, Michel, Ruhrmann, & Schimmelmann, 2017), a random-selection representative general population telephone study (N=2683, aged 16-40 years). The telephone interview assessed socio-demographic variables, lifetime healthcare utilisation, and axis-I disorders. After completion of each interview, German-speaking participants (n=2519) were asked to fill out an add-on questionnaire about knowledge about mental illness, attitudes towards them and attitudes towards help-seeking. Of these, 1375 questionnaires were returned (see Figure 1 in Study 2 for recruitment procedure). The questionnaire was in accordance with the questionnaire used by the group of Angermeyer and colleagues (Angermeyer, Matschinger, & Corrigan, 2004) in Germany and started with an unlabelled case vignette describing a person with either major depression or schizophrenia, like the one at the beginning of this thesis. After reading the vignette, participants answered questions about potential causal explanations

for the condition described in the vignette, and about stigmatising attitudes towards the person described in the vignette as well as towards help-seeking for potential own mental problems.

Study 2 aimed to disentangle the complex interrelation between knowledge, stigma and behaviour using SEM. Given the theoretical background (see Introduction) and results of Study 1, we expected that causal explanations for mental illness will influence the perception of persons with mental illness as being ‘unpredictable/dangerous’ and the perception of treatment as being ‘not embarrassing/comfortable’ (cognitive-affective components of attitudes), which in turn influence WSD and help-seeking intentions (cognitive-behavioural components of attitudes). Furthermore, we expected the latter two to directly influence healthcare utilisation. SEM allowed us to consider relations between the stigma components and associations between causal explanations (see eFigure1 of Study 2 for the proposed model). It is important to note that, contrary to Study 1, we used positive attitudes toward help-seeking instead of negative attitudes towards help-seeking. This methodological decision, however, does not reduce the comparability of Study 1 and Study 2 since the assessed help-seeking attitudes are much alike and only differ in polarity (negative attitudes on one end of the scale, positive attitude on the other end of the scale). After removing non-significant associations and latent variables from the equation, we found two major pathways mostly confirming our hypotheses. One pathway stimulated own healthcare utilisation, and one impeded own healthcare utilisation.

As for the stimulating pathway, persons were more likely to use healthcare for their mental problems if they endorsed high psychosocial stress and low constitution/ personality related causal explanations that were associated with a more positive perception of help-seeking and more help-seeking intentions (HelpA) (see Figure 2 in Study 2). In line with Study 1, HelpA were associated with healthcare utilisation, yet the

role of causal explanations in this association that had not been studied before was surprising. According to research on attitudes towards persons with mental problems (Schomerus et al., 2014; Kvaale et al., 2013), we had expected that, along with other causal explanations, biogenetic causal explanations would influence HelpA. Yet, contrary to our expectations, biogenetic causal explanations played no role in the stimulating pathway. Rather, HelpA was associated with constitution/personality related and with psychosocial stress related causal explanations. Constitution/personality related causal explanations negatively influenced the perception of help-seeking as being pleasant and not embarrassing. Persons who believe mental illness to be caused by a weak will or by an immoral lifestyle had little positive HelpA. Moreover, psychosocial stress related causal explanations were positively associated with HelpA. Persons who believe mental illness to be caused by work-related stress or problems in the family, i.e. environmental factors, had more positive HelpA. The influence of psychosocial causal explanations on HelpA had not been demonstrated before, while the influence of psychosocial causal explanations on PersonS had already been reported (Lincoln, Arens, Berger, & Rief, 2008; Walker & Reader, 2002). Finally, partially supporting assumptions based on the theory of planned behaviour (Ajzen, 1991) that help-seeking intentions reflect actual healthcare utilisation, help-seeking intentions were a significant predictor of healthcare utilisation, yet the moderate strength of this association also indicated that they are not the same. Thereby positive help-seeking intentions were more frequent than active healthcare utilisation.

As for the impeding pathway, persons are less likely to use healthcare for their own mental problems when they endorsed high biogenetic and high constitution/personality related as well as low psychosocial stress related causal explanations leading to a stronger perception of individuals with a mental disorder being ‘unpredictable/dangerous’ and to an increased WSD towards this person (PersonS) (see Figure 2, Study 2). In this, our results suggest an only minor role of biogenetic causal explanations as opposed to

constitution/personality related or psychosocial stress related causal explanations on PersonS. Examining the effect of the vignette in sensitivity analyses, the global model was largely confirmed with the exception that (1) in the depression vignette model, the influence of biogenetic causal explanations on stigmatising attitudes disappeared, while (2) in the schizophrenia vignette model, the influence of WSD on healthcare utilisation disappeared.

Additionally, we were able to show that the different aspects of stigmatising attitudes were associated. Perceiving a person with a mental illness as unpredictable/dangerous increased the WSD, while perceiving help-seeking as ‘not embarrassing/pleasant’ increased help-seeking intentions. This finding is supported by an earlier stated ‘synergistic’ relationship between components of stigmatising attitudes (Maio & Haddock, 2015) and earlier findings in the field of mental illness related stigma (Lee et al., 2014; Schomerus et al., 2014). Surprisingly, however, perceiving a person with a mental illness as ‘unpredictable/dangerous’ enhanced own help-seeking intentions. This finding was only reflected in the schizophrenia vignette model in the sensitivity analyses. Contrary to this finding and our expectation (Schomerus et al., 2009; Yap, Wright, & Jorm, 2011), a strong WSD was not directly associated with help-seeking intentions but increased the perception of help-seeking as ‘embarrassing/unpleasant’, which, in turn, decreased help-seeking intentions.

Study 2 revealed two pathways between causal explanations, stigmatising attitudes and healthcare utilisation, thereby both supporting and expanding existing knowledge. Our results might be incorporated in future, even more comprehensive studies on the associations between MHL, stigma, and healthcare utilisation. Furthermore, they will help to plan future mental health campaigns that aim to facilitate (early) healthcare utilisation. The two pathways were largely independent of the clinical picture illustrated in the two



vignettes as well as of sociodemographic and clinical characteristics of participants.

Nevertheless, subgroup analyses revealed some disorder specific associations that might also in future inform disorder-specific studies and mental health campaigns.

## **Discussion and Future Directions**

This PhD thesis provides more robust knowledge on the association between mental illness related stigma, one of the most important barriers to healthcare utilisation, and healthcare utilisation. Furthermore, it expanded existing literature on the interrelations between MHL, stigmatising attitudes, and healthcare utilisation. Focussing on the general population rather than on clinical samples, this work was able to avoid potential selection biases inherent to patient samples and provide insights directly relevant to mental health campaigns promoting (early) healthcare utilisation in the general population. This section will discuss the main findings in the light of earlier studies and social psychological research and theories. Furthermore, it will make suggestions for future studies and for campaigns promoting healthcare utilisation via improving MHL and stigmatising attitudes.

In the light of earlier studies (see Introduction), five main findings are particularly noteworthy: First, negative PersonS reduce, while positive HelpA increase own healthcare utilisation (Study 1 and Study 2). The effect of PersonS was slightly (Study 1) or considerably weaker (Study 2) than the effect of HelpA on healthcare utilisation and completely disappeared when only the schizophrenia vignette was considered. This was surprising, as in light of the reported higher WSD towards person with schizophrenia compared to persons with depression (Angermeyer et al., 2004), a stronger impact of WSD on healthcare utilisation could have been expected in the schizophrenia vignette subgroup. A possible explanation for this finding is that symptoms of schizophrenia or psychotic disorders are with a lifetime prevalence of 3.5% (Perälä, 2007) much rarer than symptoms of depression with a lifetime prevalence of 16.6% (Kessler et al., 2005). Symptoms of schizophrenia might therefore be strange and inexplicable for an average person and perceived as decidedly different from any ‘normal’ state of mind. Symptoms of depression on the other side might be more comprehensible because individuals are more familiar

with them, they are closer to a ‘known’ state of mind and more likely perceived as lying on an extreme end of a continuum. Endorsing continuum beliefs of mental illness was associated with a smaller WSD (Makowski et al. 2017). Thus, in line with the assumption that a strong separation between “us”, the “healthy and normal”, and “them”, the “ill and unpredictable” (Markowski et al. 2017), a high WSD towards a person with strange psychotic symptoms who is less likely perceived as “one of us” might have a weaker influence on own behaviour than a high WSD towards a person with more comprehensible depressive symptoms who is likely still perceived as “one of us”.

Study 2 reinforced the finding of Study 1 that HelpA (incl. help-seeking intentions) are equally, if not more important determinants of healthcare utilisation compared to PersonS, although so far being less focussed in mental healthcare campaigns (Henderson, Evans-Lacko, & Thornicroft, 2013; Mehta et al., 2015; Thornicroft et al., 2016). The theory of planned behaviour (Ajzen, 1991) postulates a strong association between attitudes towards a behaviour, the intention to perform the behaviour, and the behaviour itself. It has been successfully used as a conceptual framework in health behaviour research (Cooke, Dahdah, Norman, & French, 2016; McDermott et al., 2015; Starfelt & White, 2016) and related campaigns. In light of this, it is surprising that campaigns promoting healthcare utilisation by reducing stigmatising attitudes have paid rather little attention to HelpA as a crucial “starting-point” on the behaviour path to healthcare utilisation.

PublicS and SelfS did not influence healthcare utilisation in our meta-analysis (Study 1). Results of SelfS, however, should be interpreted with caution since most studies only used a single item to assess this stigma type and the pooled effect only just failed level of significance. One methodological explanation of this finding is that a single item might not be enough to assess the complexity of SelfS. Another is that SelfS requires the presence of mental problems or disorders in order to develop and, consequently, its true effect might

not be revealed in general population studies in that most persons will not suffer from mental problems. Thus future studies should include more comprehensive measures of SelfS and examine the effects of SelfS in relation to the presence of mental problems.

When assessing associations between mental illness stigma and healthcare utilisation, Studies 1 and 2 underscored earlier findings on the importance to distinguish between different aspects of stigma (Eisenberg et al., 2009; Vogt et al., 2014). We showed that especially personal attitudes, such as PersonS and HelpA, influence own healthcare utilisation, while the perception of stigmatising attitudes of others (PublicS) failed to do so. Second, although stigmatising attitudes are distinct and differentially influence healthcare utilisation, they are nevertheless associated. A surprising interrelation was that perceiving a person with a mental illness as ‘unpredictable/dangerous’ enhanced help-seeking intentions. In the sensitivity analyses according to the vignette (Study 2), this finding was specific to the schizophrenia vignette model. This indicates that this association might depend on the strength of the perceived unpredictability/dangerousness that is commonly stronger in schizophrenia than in depression (Angermeyer et al., 2004; Angermeyer, Holzinger, & Matschinger, 2010). Participants express a stronger intention to seek help for mental problems because they might want to prevent the development of psychotic symptoms that, in their perception, could come along with unpredictability/dangerousness. Contrary to our expectation (Schomerus et al., 2009; Yap et al., 2011), a strong WSD was not directly associated with help-seeking intentions but mediated by the perception of help-seeking as ‘embarrassing/unpleasant’. Since Study 2 was the first study to examine stigmatising attitudes in this complexity using a SEM approach, future studies have to be replicate and further extend these finding before we can draw concrete conclusions. A simple explanation might be, that the WSD towards persons with mental disorder is transferred to mental healthcare services and, consequently, contact with these is assumed to be unpleasant. Along the same line of argument, the perceived

unpredictability/dangerousness of persons with mental illness that feeds WSD might be extended to mental health professionals who frequently share the poor image of their clientele (Möller-Leimkühler, Möller, Maier, Gaebel, & Falkai, 2016; Nessler, 2011).

Third, to detect stigmatising attitudes in the population, the mode of assessment might not be as important as earlier stated (Krumpal, 2013). Earlier, questionnaires were assumed to be more suitable to assess social taboos such as stigmatising attitudes (Krumpal, 2013). Study 1, however, indicated that face-to-face assessments were associated with a stronger negative effect of stigma on healthcare utilisation than questionnaire assessments. If this is generally true, the already impressive effects of stigmatising attitudes on healthcare utilisation of Study 2 might only give a lower estimate of their real importance, thus underlining the need for more research in order to more efficiently fight stigma.

Additionally, studies with higher response rates showed stronger negative effects of stigma on healthcare utilisation. Since higher response rates reduce potential non-responder bias (Asch, Jedrzejewski, & Christakis, 1997), results of these studies might be more reliable (Baruch & Holtom, 2008). The inspection of single study effects revealed that a higher percentage of studies with face-to-face assessments than of questionnaire assessments reported high response rates. We therefore concluded that a potential sampling bias associated with lower response rates might play a more important role in detecting associations between stigma and healthcare utilisation than the mode of assessment. In light of this, Study 2 with its high response rates will likely have delivered a realistic picture.

Fourth, regarding factors potentially influencing stigmatising attitudes, we studied knowledge about causal explanations of mental illness as an important part of MHL. Unexpectedly, although a main focus of earlier studies (Kvaale et al., 2013), biogenetic causal explanations were not the strongest predictor of PersonS and not predictive of

HelpA. Rather, psychosocial and constitution/personality related causal explanations seem to be most important. This supports earlier notions of Jorm and Griffiths (2008) and Yap and colleagues (2013) who had pointed out the important role of personal weakness, one of the main factors of our latent variable ‘constitution/personality’, in relation to stigmatising attitudes. Earlier results on the association between psychosocial causal explanations and stigmatising attitudes had inconsistently reported either a favourable influence on stigmatising attitudes towards individuals with schizophrenia (Lincoln et al., 2008) or no influence in relation to individuals with an unspecific mental illness (Walker & Read, 2002). Our results suggest that psychosocial or constitution/personality related causal explanations should move more into focus when both assessing determinants of stigmatising attitudes and planning anti-stigma campaigns. Furthermore, the differential role of biogenetic causal explanations in the two vignettes indicates the need for more disorder-specific stigma studies and campaigns and might support tailoring psychoeducation about specific disorders in the clinical practice in a way that avoids self-stigmatisation.

Fifth, although closely associated as assumed by the theory of planned behaviour (Ajzen, 1991), intentions to seek help in the hypothetical case of own mental problems cannot be equalled to actual behaviour (Study 2). While most persons would recommend seeking professional help for mental problems (Holzinger, Matschinger, & Angermeyer, 2011) or report intentions to seek help for potential own mental health problems (Lally et al., 2013), a much lower proportion actually engage in it (Wang et al., 2007) resulting in the large treatment gap in mental disorders (Wittchen et al., 2011). Studies assessing the influence of stigmatising attitudes on help-seeking should therefore focus actual behaviour rather than mere intentions.

Several suggestions for future research and for future campaigns promoting mental healthcare result from these five main findings that will be described in the following.

### **Future Studies**

Multiple direct associations between healthcare utilisation and stigmatising attitudes (i.a. Study 1 and Study 2) as well as other barriers to healthcare utilisation, such as ‘low perceived need’ (Andrade et al., 2014; Mojtabai et al., 2011) or the ‘preference to handle the problem on one’s own’ (Adler et al., 2015; Chen, et al., 2013; Gulliver et al., 2010; Mojtabai et al., 2011), had already been studied and described. They were commonly studied separate of each other so that their interrelation is still unknown. For example, persons might want to handle the problem on their own because of their own stigmatising attitudes towards individuals with mental. Another example might be that they do not perceive a need for treatment because they expect the problems to disappear spontaneously and, meanwhile, do not want to risk being unnecessarily stigmatised themselves. Furthermore, if persons do not believe that the available treatment is helpful, they might rather prefer to handle the problem on their own or do not perceive a need for treatment. Studies on such interrelations are wanted to understand the relationship between different barriers to healthcare utilisation or to detect potential subgroups of persons at risk to delay or completely avoid healthcare utilisation in case of mental problems.

Most studies of the association between mental illness related stigma and healthcare utilisation, including our Study 2, refer to the theory of planned behaviour (Ajzen, 1991) as the rationale for studying help-seeking intentions as a proxy for healthcare utilisation, i.e., for the assumed strong association between intentions and behaviour. The theory of planned behaviour postulates that human behaviour is guided by intentions towards this behaviour, which in turn is influenced by attitudes toward the behaviour, subjective norm and perceived behavioural control (Ajzen, 1991). Subjective norm is understood as the

perceived social pressure to engage in a behaviour. Perceived behavioural control is understood as persons' perception of their ability to engage in a given behaviour, i.e. self-efficacy. The theory of planned behaviour was supported in many domains of behavioural health-related research both cross-sectionally (Ajzen, 2015; Hagger, Chatzisarantis, & Biddle, 2002; Sheeran & Taylor, 1999) and prospectively (McEachan, Conner, Taylor, & Lawton, 2011). But strictly speaking and to the best of my knowledge, theory of planned behaviour was not examined in the field of mental healthcare utilisation and only recently informed first studies in this field (Russo, Stochl, Croudace, Graffy, Youens, Jones, & Perez, 2012; Russo, Stochl, Painter, Shelley, Jones, & Perez, 2015). More frequently, this theory had been successfully applied in the related field of health behaviour studies that aimed to identify antecedents of health behaviours and design effective interventions (Cooke et al., 2016; McDermott et al., 2015; Starfelt & White, 2016). Thus, the theory of planned behaviour might well inform studies on the similar questions of antecedents of health care utilisation for mental problems as an extension of traditional "health behaviour". Future studies involving this theory on the background of mental health incorporating perceived behavioural control and subjective norm along with attitudes towards help-seeking and towards persons with mental illness are therefore required.

Regarding the measurement of stigma, explicit measures of stigmatising attitudes, such as applied in questionnaire studies where the person indicates explicit agreement to a stigmatising statement, might not be most appropriate. Persons might not be able to access their attitude because it is not open to introspection, or they might want to hide it because it is not socially desirable (Fazio & Olson, 2003; Greenwald & Banaji, 1995). One possibility to overcome this problem are implicit measures, such as the implicit association test, that is applied on the computer (Greenwald, McGhee, & Schwartz, 1998). With the wide accessibility of modern technology, however, computer based studies on mental illness stigma using such implicit measures in a large general population samples appear well



feasible and would increase the so far limited knowledge on implicit mental illness related attitudes (Hinshaw & Stier, 2008). Yet, in other domains of behaviour research, implicit attitudes were mainly associated with impulsive behavioural responses, while explicit attitudes were mainly associated with controlled and elaborated behavioural responses (Fazio & Towles-Schwen, 1999; Frieze, Hofmann, & Wänke, 2008; Starck & Deutsch, 2004). As the decision to seek help for a mental problem is most probably the result of elaborated cognitive effort, the significance of implicit attitudes for healthcare utilisation might thus be questionable.

Furthermore, longitudinal studies on the association between causal explanation and mental illness related stigmatising attitudes in predicting future healthcare utilisation in general populations are rare (Study 1). Yet, past healthcare utilisation might shape persons' attitudes towards help-seeking or towards individuals with mental illness including themselves and, thus, might only have limited relevance to first healthcare utilisation for mental problems. As another sensitivity analysis of Study 1, that only based on few studies and was therefore not reported as one of the main findings before, indicates, the association between stigmatising attitudes and future healthcare utilisation might be unclear (see Figure 3 in Study 1). Therefore, more longitudinal studies on this topic are clearly required.

### **Future Campaigns and Interventions**

Anti-stigma interventions and campaigns involve education/information about mental illness and/or social contact with the stigmatised group. Despite the variety of methodological approaches to reduce stigma in the population and in target groups, these interventions generally reduce stigmatising attitudes in the short- and medium term (Corrigan et al., 2015; Mehta et al., 2015; Thornicroft et al., 2014; Thornicroft et al., 2016). It is unclear, however, if these improvements translate into increased healthcare utilisation;

this outcome should be targeted in future interventions or campaigns and their evaluation (Thornicroft et al., 2016). Moreover, most efforts targeted the reduction of PersonS. If the ultimate aim of these interventions is to facilitate (early) healthcare utilisation via a reduction of stigmatising attitudes, the results of this PhD thesis in light of the theory of planned behaviour (Ajzen, 1991) indicated that HelpA should be additionally targeted. The need for improving the image of psychiatry in order to fight the unmet needs of mental health treatments has recently been addressed by the European Psychiatric Association as part of its Guidance projects (Bhugra et al., 2015; Möller-Leimkühler et al., 2016). Yet, public campaigns to this aim were not in the focus of the recommendation, likely for lack of sufficient knowledge about influencing factors of stigmatising attitudes such as causal explanations. Study 2 indicated that causal explanations related to the person, such as constitution/personality and biogenetics, reinforce stigmatising attitudes while environmental explanations, such as psychosocial, reduce stigmatising attitudes. Yet, mental disorders might be caused by person-related and environmental factors to different degrees and, consequently, treatment options differ. Campaigns improving MHL should communicate these facts along with treatment success rates and should emphasise that symptoms can be improved, regardless of their cause, thus conveying a positive image of psychiatry (Möller-Leimkühler et al., 2016).

Contrary to the positive short- and medium-term effects of public campaigns, long-term changes in stigmatising attitudes seem to be more difficult to achieve (Thornicroft et al., 2016) and, according to the elaboration likelihood model (Petty & Cacioppo, 1986), depend on the motivation of the person to process arguments that contradict own attitudes. This motivation is determined by the perceived personal relevance of the message (Petty, Cacioppo, & Schuman, 1983; Petty, Briñol, & Priester, 2009). Therefore, campaigns that aim to achieve an enduring change of recipients' attitudes should first try to increase their motivation to process the message by increasing the personal relevance of the message

(Petty et al., 2009). Personal relevance can be enhanced by linking the message to aspects of the self, such as personal values or a personal outcome (Briñol & Petty, 2006); and even simply changing the pronouns of a message from ‘one’ or ‘she and he’ to ‘you’ can increase personal involvement and processing of the arguments (Burnkrant & Unnava, 1989). Thus, relating to social psychology that has a long history of research on changing attitudes and related behaviour might again improve future research and campaigns addressing mental health.

In countries such as Australia, Germany, Norway, UK, and New Zealand efforts to improve public’s mental health has a longer tradition than in Switzerland; and several national and regional awareness and anti-stigma campaigns targeted at the general population were realised and evaluated (Gaebel, Zäske, Baumann, Klosterkötter, Maier, Decker, & Möller, 2008; Jorm et al., 2005; Kitchener & Jorm, 2002; Paykel, Hart, & Priest, 1998; Sogaard & Fønnebø, 1995; Thornicroft et al., 2014). In Switzerland, the prevention and early intervention of non-communicable disease, including mental illness, came stronger into focus of politics in 2012 when agents at federal, cantonal, and non-governmental level decided to work closer together to improve population’s mental health. According to a first national report aiming to determine goals to promote mental health in Switzerland, improvement of population’s knowledge and de-stigmatisation are listed as one out of four main fields of action (Bundesamt für Gesundheit, 2015). This was an important step for the promotion of the Swiss population’s mental health and includes university research of prevention and early detection of mental problems as well as evaluation of ongoing campaigns (Bundesamt für Gesundheit, 2015). As a researcher and all the more as a member of the Swiss community, I am glad to see these national developments towards a better mental health and will do my best to take an active part in it. This PhD thesis is my first step towards this aim.

Table 1

*Different aspects of mental illness related stigmatising attitudes*

Stigma type	Explanation	Examples	
		cognitive-affective component	cognitive-behavioural component
Public Stigma	Population's negative attitudes towards a person with a mental illness.		
Perceived Public Stigma (PublicS)	Perceptions of an individual about the stigmatising attitudes of others or the majority of the population.	<i>I think that most others think that an individual with a mental illness is unpredictable.</i>	<i>I think that most others would not let a person with a mental illness babysit their children.</i>
Personal Stigma (PersonS)	Personal stigmatising attitudes toward a person with a mental illness.	<i>I think that persons with a mental illness are unpredictable.</i>	<i>I would not let a persons with a mental illness babysit my child (wish for social distance).</i>
Self-stigma (SelfS)	An individual affected with a mental illness considers stigmatising attitudes to be self-relevant and beliefs to be a devaluated member of society.	<i>I am unpredictable because of my mental illness.</i>	<i>I might not be capable to babysit children because of my mental illness.</i>
Attitudes towards mental health help-seeking (HelpA)	Personal stigmatising attitudes towards mental health professionals, toward mental health institutions, and perception of helpfulness of offered or sought help.	<i>I feel embarrassed talking to a professional about my mental problems.</i>	<i>In case of a mental illness, I would not seek help with a professional.</i>

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**Statement of authorship**

I hereby certify that this doctoral thesis has been composed by myself, and describes my own work, unless otherwise acknowledged in the text. All references and verbatim extracts have been quoted, and all sources of information have been specifically acknowledged. The work has not been accepted in any previous application for a degree. I am aware that otherwise, according to the article 36(1)(o) of the law of the 5th of September 1996, the senate is entitled to withdraw the title obtained by the present thesis.

Bern, September 2017

Nina Schnyder

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### Literature

- Adler, A. B., Britt, T. W., Riviere, L. A., Kim, P. Y., & Thomas, J. L. (2015). Longitudinal determinants of mental health treatment-seeking by US soldiers. *The British Journal of Psychiatry*, 207(4), 346-350.
- Ajzen, I. (2015). Consumer attitudes and behavior: the theory of planned behavior applied to food consumption decisions. *Rivista di Economia Agraria*, 70(2), 121-138.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Anderson, I. M., Ferrier, I. N., Baldwin, R. C., Cowen, P. J., Howard, L., Lewis, G., ... & Tylee, A. (2008). Evidence-based guidelines for treating depressive disorders with antidepressants: a revision of the 2000 British Association for Psychopharmacology guidelines. *Journal of Psychopharmacology*, 22(4), 343-396.
- Andrade, L. H., Alonso, J., Mneimneh, Z., Wells, J. E., Al-Hamzawi, A., Borges, G., ... & Florescu, S. (2014). Barriers to mental health treatment: results from the WHO World Mental Health surveys. *Psychological Medicine*, 44(6), 1303-1317.
- Angermeyer, M. C., Holzinger, A., & Matschinger, H. (2009). Mental health literacy and attitude towards people with mental illness: a trend analysis based on population surveys in the eastern part of Germany. *European Psychiatry*, 24(4), 225-232.
- Angermeyer, M. C., Holzinger, A., & Matschinger, H. (2010). Emotional reactions to people with mental illness. *Epidemiology and Psychiatric Sciences*, 19(1), 26-32.
- Angermeyer, M. C., Matschinger, H., & Corrigan, P. W. (2004). Familiarity with mental illness and social distance from people with schizophrenia and major depression: testing a model using data from a representative population survey. *Schizophrenia Research*, 69(2), 175-182.

- Angermeyer, M. C., Matschinger, H., & Schomerus, G. (2013). Attitudes towards psychiatric treatment and people with mental illness: changes over two decades. *The British Journal of Psychiatry*, 2(203), 146-151.
- Angermeyer, M. C., Matschinger, H., & Schomerus, G. (2017). 50 Jahre psychiatrische Einstellungsforschung in Deutschland. *Psychiatrische Praxis*, doi: 10.1055/s-0043-105723.
- Arroll, B., Elley, C. R., Fishman, T., Goodyear-Smith, F. A., Kenealy, T., Blashki, G., ... & MacGillivray, S. (2009). Antidepressants versus placebo for depression in primary care. *The Cochrane Library*.
- Asch, D. A., Jedrzejewski, M. K., & Christakis, N. A. (1997). Response rates to mail surveys published in medical journals. *Journal of Clinical Epidemiology*, 50(10), 1129-1136.
- Baruch, Y., & Holtom, B. C. (2008). Survey response rate levels and trends in organizational research. *Human Relations*, 61(8), 1139-1160.
- Bhugra, D., Sartorius, N., Fiorillo, A., Evans-Lacko, S., Ventriglio, A., Hermans, M. H. M., ... & Bennemar, M. R. (2015). EPA guidance on how to improve the image of psychiatry and of the psychiatrist. *European Psychiatry*, 30(3), 423-430.
- Bobes, J., Garcia-Portilla, M. P., Bascaran, M. T., Saiz, P. A., & Bouzoño, M. (2007). Quality of life in schizophrenic patients. *Dialogues in clinical neuroscience*, 9(2), 215.
- Bordieri, J. E., & Drehmer, D. E. (1986). Hiring decisions for disabled workers: Looking at the cause. *Journal of Applied Social Psychology*, 16(3), 197-208.
- Briñol, P., & Petty, R. E. (2006). Fundamental processes leading to attitude change: Implications for cancer prevention communications. *Journal of Communication*, 56(1), 81-104.



Bundesamt für Gesundheit (BAG) (2015). *Psychische Gesundheit in der Schweiz.*

*Bestandhaufnahme und Handlungsfelder. Bericht im Auftrag des Dialogs Nationale*

*Gesundheitspolitik.* Retrieved from

<https://www.bag.admin.ch/bag/de/home/themen/mensch-gesundheit/psychische-gesundheit/politische-auftraege-im-bereich-psychische-gesundheit/dialogbericht-psychische-Gesundheit.html>

Burnkrant, R. E., & Unnava, H. R. (1989). Self-referencing: A strategy for increasing processing of message content. *Personality and Social Psychology Bulletin*, 15(4), 628-638.

Chen, L. Y., Crum, R. M., Martins, S. S., Kaufmann, C. N., Strain, E. C., & Mojtabai, R. (2013). Service use and barriers to mental health care among adults with major depression and comorbid substance dependence. *Psychiatric Services*, 64(9), 863-870.

Clement, S., Schauman, O., Graham, T., Maggioni, F., Evans-Lacko, S., Bezborodovs, N., ... & Thornicroft, G. (2015). What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychological Medicine*, 45(1), 11-27.

Cooke, R., Dahdah, M., Norman, P., & French, D. P. (2016). How well does the theory of planned behaviour predict alcohol consumption? A systematic review and meta-analysis. *Health Psychology Review*, 10(2), 148-167.

Corrigan, P. W. (2004). How stigma interferes with mental health care. *American Psychologist*, 59(7), 614-625.

Corrigan, P. W., Druss, B. G., & Perlick, D. A. (2014). The impact of mental illness stigma on seeking and participating in mental health care. *Psychological Science in the Public Interest*, 15(2), 37-70.

- Corrigan, P. W., Michaels, P. J., & Morris, S. (2015). Do the effects of antistigma programs persist over time? Findings from a meta-analysis. *Psychiatric Services*, 66(5), 543-546.
- Corrigan, P. W., Watson, A. C., & Barr, L. (2006). The self-stigma of mental illness: Implications for self-esteem and self-efficacy. *Journal of Social and Clinical Psychology*, 25(8), 875-884.
- Coverdale, J., Nairn, R., & Claasen, D. (2002). Depictions of mental illness in print media: A prospective national sample. *Australian and New Zealand Journal of Psychiatry*, 36(5), 697-700.
- Crocetti, G., Spiro, H. R., & Siassi, I. (1971). Are the ranks closed? Attitudinal social distance and mental illness. *American Journal of Psychiatry*, 127(9), 1121-1127.
- Cuddy, A. J., Fiske, S. T., & Glick, P. (2007). The BIAS map: behaviors from intergroup affect and stereotypes. *Journal of Personality and Social Psychology*, 92(4), 631-648.
- Cuijpers, P., Sijbrandij, M., Koole, S. L., Andersson, G., Beekman, A. T., & Reynolds, C. F. (2014). Adding psychotherapy to antidepressant medication in depression and anxiety disorders: a meta-analysis. *World Psychiatry*, 13(1), 56-67.
- Dietrich, S., Mergl, R., & Rummel-Kluge, C. (2014). Personal and perceived stigmatization of depression: A comparison of data from the general population, participants of a depression congress and job placement officers in Germany. *Psychiatry Research*, 220(1), 598-603.
- Dividio, J. F., Hewstone, M., Glick, P., & Esses, V. M. (2010). Prejudice, Stereotyping and Discrimination: Theoretical and Empirical Overview. In J. F. Dividio, M. Hewstone, P. Glick, & V. M. Esses (Eds.), *Prejudice, Stereotyping and Discrimination* (pp. 3-28).

- Eisenberg, D., Downs, M. F., Golberstein, E., & Zivin, K. (2009). Stigma and help seeking for mental health among college students. *Medical Care Research and Review*, 66(5), 522-541.
- Evans-Lacko, S., Brohan, E., Mojtabai, R., & Thornicroft, G. (2012). Association between public views of mental illness and self-stigma among individuals with mental illness in 14 European countries. *Psychological Medicine*, 42(8), 1741-1752.
- Evans-Lacko, S., Henderson, C., & Thornicroft, G. (2013). Public knowledge, attitudes and behaviour regarding people with mental illness in England 2009-2012. *The British Journal of Psychiatry*, 202(55), 51-57.
- Fazio, R. H., & Olson, M. A. (2003). Implicit measures in social cognition research: Their meaning and use. *Annual Review of Psychology*, 54(1), 297-327.
- Fazio, R. H., & Towles-Schwen, T. (1999). The MODE model of attitude-behavior processes. In S. Chaiken, & Y. Trope (Eds), *Dual-process Theories in Social Psychology* (pp.97–116). New York, NY: Guilford Press.
- Fischer, E. H., & Turner, J. I. (1970). Orientations to seeking professional help: development and research utility of an attitude scale. *Journal of Consulting and Clinical Psychology*, 35(1), 79-90.
- Fiske, S. T. (1998). Stereotyping, prejudice, and discrimination. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The Handbook of Social Psychology*, Vols. 1 and 2 (4th ed.) (pp. 357-411). New York, NY: McGraw-Hill.
- Fournier, J. C., DeRubeis, R. J., Hollon, S. D., Dimidjian, S., Amsterdam, J. D., Shelton, R. C., & Fawcett, J. (2010). Antidepressant drug effects and depression severity: a patient-level meta-analysis. *Jama*, 303(1), 47-53.

Francis, C. (2001). *Mental Health and Illness in the Media: A Review of the Literature: Executive Summary*. Commonwealth Department of Health and Aged Care.

Friese, M., Hofmann, W., & Wänke, M. (2008). When impulses take over: Moderated predictive validity of explicit and implicit attitude measures in predicting food choice and consumption behaviour. *British Journal of Social Psychology*, 47(3), 397-419.

Gaebel, W., Zäske, H., Baumann, A. E., Klosterkötter, J., Maier, W., Decker, P., & Möller, H. J. (2008). Evaluation of the German WPA “program against stigma and discrimination because of schizophrenia—Open the Doors”: results from representative telephone surveys before and after three years of antistigma interventions. *Schizophrenia Research*, 98(1), 184-193.

Gary, F. A. (2005). Stigma: Barrier to mental health care among ethnic minorities. *Issues in Mental Health Nursing*, 26(10), 979-999.

Glasman, L. R., & Albarracín, D. (2006). Forming attitudes that predict future behavior: a meta-analysis of the attitude-behavior relation. *Psychological Bulletin*, 132(5), 778-822.

Goodwin, G. O., & Consensus Group of the British Association for Psychopharmacology. (2009). Evidence-based guidelines for treating bipolar disorder: revised second edition—recommendations from the British Association for Psychopharmacology. *Journal of Psychopharmacology*, 23(4), 346-388.

Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: attitudes, self-esteem, and stereotypes. *Psychological Review*, 102(1), 4-27.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: the implicit association test. *Journal of Personality and Social Psychology*, 74(6), 1464-1480.

- Griffiths, K. M., Christensen, H., & Jorm, A. F. (2008). Predictors of depression stigma. *BMC Psychiatry*, 8(1), 25-37.
- Gu, J., Strauss, C., Bond, R., & Cavanagh, K. (2015). How do mindfulness-based cognitive therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies. *Clinical Psychology Review*, 37, 1-12.
- Gulliver, A., Griffiths, K. M., & Christensen, H. (2010). Perceived barriers and facilitators to mental health help-seeking in young people: a systematic review. *BMC Psychiatry*, 10(1), 113-122.
- Gustavsson, A., Svensson, M., Jacobi, F., Allgulander, C., Alonso, J., Beghi, E., ... & Gannon, B. (2011). Cost of disorders of the brain in Europe 2010. *European Neuropsychopharmacology*, 21(10), 718-779.
- Hagger, M. S., Chatzisarantis, N. L., & Biddle, S. J. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology*, 24(1), 3-32.
- Harris, M. G., Diminic, S., Burgess, P. M., Carstensen, G., Stewart, G., Pirkis, J., & Whiteford, H. A. (2014). Understanding service demand for mental health among Australians aged 16 to 64 years according to their possible need for treatment. *Australian and New Zealand Journal of Psychiatry*, 48(9), 838-851.
- Henderson, C., Evans-Lacko, S., & Thornicroft, G. (2013). Mental illness stigma, help seeking, and public health programs. *American Journal of Public Health*, 103(5), 777-780.

- Hinshaw, S. P., & Stier, A. (2008). Stigma as related to mental disorders. *Annual Review of Clinical Psychology*, 4, 367-393.
- Hofmann, S. G., & Smits, J. A. (2008). Cognitive-behavioral therapy for adult anxiety disorders: a meta-analysis of randomized placebo-controlled trials. *The Journal of Clinical Psychiatry*, 69(4), 621-632.
- Holzinger, A., Matschinger, H., & Angermeyer, M. C. (2011). What to do about depression? Help-seeking and treatment recommendations of the public. *Epidemiology and Psychiatric Sciences*, 20(2), 163-169.
- Hunt, W., MacKinnon, R., & Michels, R. (1974). Explaining the increased arrest rate among mental patients: A cautionary note. *Journal of Medical Education*, 49, 368-373.
- IsHak, W. W., Greenberg, J. M., Balayan, K., Kapitanski, N., Jeffrey, J., Fathy, H., ... & Rapaport, M. H. (2011). Quality of life: the ultimate outcome measure of interventions in major depressive disorder. *Harvard Review of Psychiatry*, 19(5), 229-239.
- Jennings, K. S., Cheung, J. H., Britt, T. W., Goguen, K. N., Jeffirs, S. M., Peasley, A. L., & Lee, A. C. (2015). How are perceived stigma, self-stigma, and self-reliance related to treatment-seeking? A three-path model. *Psychiatric Rehabilitation Journal*, 38(2), 109-116.
- Jorm, A. F., Christensen, H., & Griffiths, K. M. (2006). The public's ability to recognize mental disorders and their beliefs about treatment: changes in Australia over 8 years. *Australian and New Zealand Journal of Psychiatry*, 40(1), 36-41.
- Jorm, A. F., Christensen, H., & Griffiths, K. M. (2005). The impact of beyondblue: the national depression initiative on the Australian public's recognition of depression and beliefs about treatments. *Australian and New Zealand Journal of Psychiatry*, 39(4), 248-254.

- Jorm, A. F., & Griffiths, K. M. (2008). The public's stigmatizing attitudes towards people with mental disorders: how important are biomedical conceptualizations? *Acta Psychiatrica Scandinavica*, 118(4), 315-321.
- Jorm, A. F., Korten, A. E., Jacomb, P. A., Christensen, H., Rodgers, B., & Pollitt, P. (1997). "Mental health literacy": a survey of the public's ability to recognise mental disorders and their beliefs about the effectiveness of treatment. *The Medical Journal of Australia*, 166(4), 182-186.
- Kessler, R. C., Angermeyer, M., Anthony, J. C., de Graaf, R. O. N., Demyttenaere, K., Gasquet, I., ... & Kawakami, N. (2007). Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization's World Mental Health Survey Initiative. *World Psychiatry*, 6(3), 168-176.
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62(6), 593-602.
- Kessler, R. C., Foster, C. L., Saunders, W. B., & Stang, P. E. (1995). Social consequences of psychiatric disorders, I: Educational attainment. *The American Journal of Psychiatry*, 152(7), 1026-1032.
- Kirsch, I., Deacon, B. J., Huedo-Medina, T. B., Scoboria, A., Moore, T. J., & Johnson, B. T. (2008). Initial severity and antidepressant benefits: a meta-analysis of data submitted to the Food and Drug Administration. *PLoS Medicine*, 5(2), e45.
- Kitchener, B. A., & Jorm, A. F. (2002). Mental health first aid training for the public: evaluation of effects on knowledge, attitudes and helping behavior. *BMC Psychiatry*, 2(1), 10.

- Klin, A., & Lemish, D. (2008). Mental disorders stigma in the media: Review of studies on production, content, and influences. *Journal of Health Communication*, 13(5), 434-449.
- Krumpal, I. (2013). Determinants of social desirability bias in sensitive surveys: a literature review. *Quality and Quantity*, 47(4), 2025-2047.
- Kvaale, E. P., Haslam, N., & Gottdiener, W. H. (2013). The ‘side effects’ of medicalization: A meta-analytic review of how biogenetic explanations affect stigma. *Clinical Psychology Review*, 33(6), 782-794.
- Lally, J., ó Conghaile, A., Quigley, S., Bainbridge, E., & McDonald, C. (2013). Stigma of mental illness and help-seeking intention in university students. *The Psychiatrist Online*, 37(8), 253-260.
- Lee, A. A., Laurent, S. M., Wykes, T. L., Andren, K. A. K., Bourassa, K. A., & McKibbin, C. L. (2014). Genetic attributions and mental illness diagnosis: effects on perceptions of danger, social distance, and real helping decisions. *Social Psychiatry and Psychiatric Epidemiology*, 49(5), 781-789.
- Leucht, S., Cipriani, A., Spineli, L., Mavridis, D., Örey, D., Richter, F., ... & Kissling, W. (2013). Comparative efficacy and tolerability of 15 antipsychotic drugs in schizophrenia: a multiple-treatments meta-analysis. *The Lancet*, 382(9896), 951-962.
- Lincoln, T. M., Arens, E., Berger, C., & Rief, W. (2007). Can antistigma campaigns be improved? A test of the impact of biogenetic vs psychosocial causal explanations on implicit and explicit attitudes to schizophrenia. *Schizophrenia Bulletin*, 34(5), 984-994.
- Livingston, J. D., & Boyd, J. E. (2010). Correlates and consequences of internalized stigma for people living with mental illness: A systematic review and meta-analysis. *Social Science and Medicine*, 71(12), 2150-2161.



Maio, G. R., & Haddock, G. (2015). *The Psychology of Attitudes and Attitude Change*.

London, UK: SAGE Publication.

Makowski, A. C., Mnich, E. E., Angermeyer, M. C., & von dem Knesebeck, O. (2016).

Continuum beliefs in the stigma process regarding persons with schizophrenia and depression: results of path analyses. *PeerJ*, 4, e2360.

McDermott, M. S., Oliver, M., Simnadis, T., Beck, E. J., Coltman, T., Iverson, D., ... &

Sharma, R. (2015). The Theory of Planned Behaviour and dietary patterns: A systematic review and meta-analysis. *Preventive Medicine*, 81, 150-156.

McEachan, R. R. C., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective

prediction of health-related behaviours with the theory of planned behaviour: A meta-analysis. *Health Psychology Review*, 5(2), 97-144.

Mehta, N., Clement, S., Marcus, E., Stona, A. C., Bezborodovs, N., Evans-Lacko, S., ... &

Koschorke, M. (2015). Evidence for effective interventions to reduce mental health-related stigma and discrimination in the medium and long term: systematic review. *The British Journal of Psychiatry*, 207(5), 377-384.

Mezuk, B., Eaton, W. W., Albrecht, S., & Golden, S. H. (2008). Depression and type 2

diabetes over the lifespan. *Diabetes Care*, 31(12), 2383-2390.

Mojtabai, R., Olfson, M., Sampson, N. A., Jin, R., Druss, B., Wang, P. S., ... & Kessler, R.

C. (2011). Barriers to mental health treatment: results from the National Comorbidity Survey Replication. *Psychological Medicine*, 41(8), 1751-1761.

Möller-Leimkühler, A. M., Möller, H. J., Maier, W., Gaebel, W., & Falkai, P. (2016). EPA

guidance on improving the image of psychiatry. *European Archives of Psychiatry and Clinical Neuroscience*, 266(2), 139-154.

- Murray, C. J. (1994). Quantifying the burden of disease: the technical basis for disability-adjusted life years. *Bulletin of the World Health Organization*, 72(3), 429-445.
- Murray, C. J., & Lopez, A. D. (1994). Quantifying disability: data, methods and results. *Bulletin of the World Health Organization*, 72(3), 481-494.
- Nessler, T. (2011). Narrated truths: the image of psychiatry in the media. *European Archives of Psychiatry and Clinical Neuroscience*, 261(2), 124-128.
- Page, S. (1977). Effects of the mental illness label in attempts to obtain accommodation. *Canadian Journal of Behavioural Science/Revue Canadienne des Sciences du Comportement*, 9(2), 85-90.
- Pagura, J., Katz, L. Y., Mojtabai, R., Druss, B. G., Cox, B., & Sareen, J. (2011). Antidepressant use in the absence of common mental disorders in the general population. *The Journal of Clinical Psychiatry*, 72(4), 494-501.
- Patel, V., Garrison, P., de Jesus Mari, J., Minas, H., Prince, M., Saxena, S., & Advisory group of the Movement for Global Mental Health. (2008). The Lancet's series on global mental health: 1 year on. *The Lancet*, 372(9646), 1354-1357.
- Paykel, E. S., Hart, D., & Priest, R. G. (1998). Changes in public attitudes to depression during the Defeat Depression Campaign. *The British Journal of Psychiatry*, 173(6), 519-522.
- Perälä, J., Suvisaari, J., Saarni, S. I., Kuoppasalmi, K., Isometsä, E., Pirkola, S., ... & Härkänen, T. (2007). Lifetime prevalence of psychotic and bipolar I disorders in a general population. *Archives of General Psychiatry*, 64(1), 19-28.
- Petty, R. E., Briñol, P., & Priester, J. R. (2009). Mass Media Attitude Change: Implications of the Elaboration Likelihood Model of Persuasion. In J. Bryant & M. B. Oliver (Eds.),

- Media Effects. Advances in Theory and Research* (pp.125-164). New York, NY: Taylor & Francis.
- Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. *Advances in Experimental Social Psychology*, 19, 123-205.
- Petty, R. E., Cacioppo, J. T., & Schumann, D. (1983). Central and peripheral routes to advertising effectiveness: The moderating role of involvement. *Journal of Consumer Research*, 10(2), 135-146.
- Reavley, N. J., & Jorm, A. F. (2012). Public recognition of mental disorders and beliefs about treatment: changes in Australia over 16 years. *The British Journal of Psychiatry*, 200(5), 419-425.
- Rugulies, R. (2002). Depression as a predictor for coronary heart disease: a review and meta-analysis. *American Journal of Preventive Medicine*, 23(1), 51-61.
- Rüsch N. & Corrigan P. W. (2013) Stigma, discrimination and mental health. In L. Knifton & N. Quinn (Eds.), *Public Mental Health. Global Perspectives* (pp. 94–108). New York: Open University Press.
- Russo, D. A., Stochl, J., Croudace, T. J., Graffy, J. P., Youens, J., Jones, P. B., & Perez, J. (2012). Use of the theory of planned behaviour to assess factors influencing the identification of individuals at ultra- high risk for psychosis in primary care. *Early Intervention in Psychiatry*, 6(3), 265-275.
- Russo, D. A., Stochl, J., Painter, M., Shelley, G. F., Jones, P. B., & Perez, J. (2015). Use of the Theory of Planned Behaviour to assess factors influencing the identification of students at clinical high-risk for psychosis in 16+ Education. *BMC Health Services Research*, 15(1), 411.

- Salize, H. J., Rössler, W., & Becker, T. (2007). Mental health care in Germany. *European Archives of Psychiatry and Clinical Neuroscience*, 257(2), 92-103.
- Sareen, J., Henriksen, C. A., Stein, M. B., Afifi, T. O., Lix, L. M., & Enns, M. W. (2013). Common mental disorder diagnosis and need for treatment are not the same: findings from a population-based longitudinal survey. *Psychological Medicine*, 43(9), 1941-1951.
- Schomerus, G., & Angermeyer, M. C. (2008). Stigma and its impact on help-seeking for mental disorders: what do we know? *Epidemiology and Psychiatric Sciences*, 17(1), 31-37.
- Schomerus, G., Matschinger, H., & Angermeyer, M. C. (2009). The stigma of psychiatric treatment and help-seeking intentions for depression. *European Archives of Psychiatry and Clinical Neuroscience*, 259(5), 298-306.
- Schomerus, G., Matschinger, H., & Angermeyer, M. C. (2014). Causal beliefs of the public and social acceptance of persons with mental illness: a comparative analysis of schizophrenia, depression and alcohol dependence. *Psychological Medicine*, 44(2), 303-314.
- Schomerus, G., Stolzenburg, S., Bauch, A., Speerforck, S., Janowitz, D., & Angermeyer, M. C. (2017). Shifting blame? Impact of reports of violence and mental illness in the context of terrorism on population attitudes towards persons with mental illness in Germany. *Psychiatry Research*, 252, 164-168.
- Schultze-Lutter, F., Michel, C., Ruhrmann, S., & Schimmelmann B.G. (2017). Prevalence and clinical relevance of interview-assessed psychosis risk symptoms in the young adult community. *Psychological Medicine*: doi: 10.1017/S0033291717002586.

- Sharp, M. L., Fear, N. T., Rona, R. J., Wessely, S., Greenberg, N., Jones, N., & Goodwin, L. (2015). Stigma as a barrier to seeking health care among military personnel with mental health problems. *Epidemiologic Reviews*, 37(1), 144-162.
- Sheeran, P., & Taylor, S. (1999). Predicting intentions to use condoms: a meta-analysis and comparison of the theories of reasoned action and planned behavior. *Journal of Applied Social Psychology*, 29(8), 1624-1675.
- Søgaard, A. J., & Fønnebø, V. (1995). The Norwegian Mental Health Campaign in 1992. Part II: changes in knowledge and attitudes. *Health Education Research*, 10(3), 267-278.
- Speerforck, S., Schomerus, G., Matschinger, H., & Angermeyer, M. C. (2017). Treatment recommendations for schizophrenia, major depression and alcohol dependence and stigmatizing attitudes of the public: results from a German population survey. *European Archives of Psychiatry and Clinical Neuroscience*, 267(4), 341-350.
- Starfelt Sutton, L. C., & White, K. M. (2016). Predicting sun-protective intentions and behaviours using the theory of planned behaviour: a systematic review and meta-analysis. *Psychology & Health*, 31(11), 1272-1292.
- Thornicroft, C., Wyllie, A., Thornicroft, G., & Mehta, N. (2014). Impact of the “Like Minds, Like Mine” anti-stigma and discrimination campaign in New Zealand on anticipated and experienced discrimination. *Australian and New Zealand Journal of Psychiatry*, 48(4), 360-370.
- Thornicroft, G., Mehta, N., Clement, S., Evans-Lacko, S., Doherty, M., Rose, D., ... & Henderson, C. (2016). Evidence for effective interventions to reduce mental-health-related stigma and discrimination. *The Lancet*, 387(10023), 1123-1132.

- Vogt, D., Fox, A. B., & Di Leone, B. A. (2014). Mental health beliefs and their relationship with treatment seeking among US OEF/OIF veterans. *Journal of Traumatic Stress*, 27(3), 307-313.
- Wahl, O. E., Wood, A., & Richards, R. (2002). Newspaper coverage of mental illness: is it changing? *Psychiatric Rehabilitation Skills*, 6(1), 9-31.
- Walker, I., & Read, J. (2002). The differential effectiveness of psychosocial and biogenetic causal explanations in reducing negative attitudes toward “mental illness”. *Psychiatry: Interpersonal and Biological Processes*, 65(4), 313-325.
- Wang, P. S., Angermeyer, M., Borges, G., Bruffaerts, R., Chiu, W. T., De Girolamo, G., ... & Kessler, R. C. (2007). Delay and failure in treatment seeking after first onset of mental disorders in the World Health Organization's World Mental Health Survey Initiative. *World Psychiatry*, 6(3), 177-185.
- Wang, Y., Henriksen, C. A., ten Have, M., de Graaf, R., Stein, M. B., Enns, M. W., & Sareen, J. (2017). Common Mental Disorder Diagnosis and Need for Treatment are not the Same: Findings from the NEMESIS Study. *Administration and Policy in Mental Health and Mental Health Services Research*, 44(4), 572-581.
- Whiteford, H. A., Degenhardt, L., Rehm, J., Baxter, A. J., Ferrari, A. J., Erskine, H. E., ... & Burstein, R. (2013). Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *The Lancet*, 382(9904), 1575-1586.
- World Bank. (1993). *World Development Report 1993: Investing in Health*. New York: Oxford University Press.
- World Health Organization. (2004<sup>a</sup>). *Prevention of mental disorders: Effective interventions and policy options*. Summary report.

- World Health Organization. (2004<sup>b</sup>). *Promoting mental health: Concepts, emerging evidence, practice*. Summary report.
- Yap, M. B. H., Reavley, N. J., & Jorm, A. F. (2013). Associations between stigma and help-seeking intentions and beliefs: findings from an Australian national survey of young people. *Psychiatry Research*, 210(3), 1154-1160.
- Yap, M. B., Wright, A., & Jorm, A. F. (2011). The influence of stigma on young people's help-seeking intentions and beliefs about the helpfulness of various sources of help. *Social Psychiatry and Psychiatric Epidemiology*, 46(12), 1257-1265.

**Journal Articles**



## Review article

## Association between mental health-related stigma and active help-seeking: systematic review and meta-analysis

Nina Schnyder, Radoslaw Panczak, Nicola Groth and Frauke Schultze-Lutter

**Background**

Mental disorders create high individual and societal costs and burden, partly because help-seeking is often delayed or completely avoided. Stigma related to mental disorders or mental health services is regarded as a main reason for insufficient help-seeking.

**Aims**

To estimate the impact of four stigma types (help-seeking attitudes and personal, self and perceived public stigma) on active help-seeking in the general population.

**Method**

A systematic review of three electronic databases was followed by random effect meta-analyses according to the stigma types.

**Results**

Twenty-seven studies fulfilled eligibility criteria. Participants' own negative attitudes towards mental health help-seeking

(OR=0.80, 95% CI 0.73–0.88) and their stigmatising attitudes towards people with a mental illness (OR=0.82, 95% CI 0.69–0.98) were associated with less active help-seeking. Self-stigma showed insignificant association (OR=0.88, 95% CI 0.76–1.03), whereas perceived public stigma was not associated.

**Conclusions**

Personal attitudes towards mental illness or help-seeking are associated with active help-seeking for mental problems. Campaigns promoting help-seeking and fighting mental illness-related stigma should target these personal attitudes rather than broad public opinion.

**Declaration of interest**

None.

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Mental disorders are the leading cause of disability worldwide, accounting for 23% of all non-fatal burden.<sup>1</sup> Approximately 38% of the EU population experience a mental disorder each year,<sup>2</sup> causing significant societal costs, estimated at €453 billion in Europe in 2010; in the USA costs were \$300 billion in 2002–2003.<sup>3,4</sup> Mental disorders are treatable and potentially preventable.<sup>5–7</sup> However, help-seeking is often delayed or completely absent.<sup>8</sup> The low treatment rate further aggravates burden and costs,<sup>9</sup> as untreated individuals are more likely to experience problematic interpersonal and family functioning and have lower life expectancies.<sup>10–13</sup> Prevention of mental disorders through early intervention and the encouragement of help-seeking are major challenges for public health.<sup>14,15</sup> However, several factors influence help-seeking for mental health problems. Desire to handle the problem on one's own, low perceived need, low mental health literacy and financial factors are associated with a reduction in help-seeking.<sup>16–20</sup> Negative and stigmatising attitudes towards mental illness, and towards help-seeking and people with mental illness, further referred to as stigma, are other important barriers to help-seeking.<sup>21–27</sup>

Commonly, four stigma types that influence help-seeking can be distinguished: perceived public stigma (PublicS), personal stigma (PersonS), self-stigma (SelfS) and attitudes towards help-seeking (HelpA). PublicS and PersonS are two types of public stigma (also referred to as social or enacted stigma), defined as the stigmatising perception about a person who has a mental illness endorsed collectively by members of the general population.<sup>22,28–31</sup> More specifically, PublicS is understood to be the individual's perception of public stigma,<sup>22</sup> as measured by Link's Perceived Devaluation Discrimination Scale;<sup>32</sup> PersonS, on the other hand, describes personal attitudes towards members of a stigmatised group,<sup>29,33–37</sup> and can find a behavioural expression in the desire for social distance.<sup>38</sup> When these two types of public stigma were compared, endorsement of PublicS was substantially higher than PersonS.<sup>33</sup>

SelfS (also called internalised or anticipated stigma) occurs when an individual affected by a mental illness endorses stereotypes about mental illness, anticipates social rejection, considers stereotypes to be self-relevant and believes himself or herself to be a devalued member of society.<sup>28–30,39–42</sup> HelpA includes the perception of a need for help, stigma tolerance associated with seeking such services, openness regarding one's problems and confidence that the help will be of assistance.<sup>43</sup> Overall, stigma is a multifaceted concept and has, therefore, been measured with a variety of instruments.<sup>28,44</sup>

Recent reviews of the influence of mental health-related stigma on help-seeking have reported that stigma, in particular SelfS and HelpA, had negative effects on help-seeking.<sup>21–27</sup> Many of these studies did not distinguish between intended or recommended and active help-seeking, thereby referring to the Theory of Planned Behaviour,<sup>45</sup> which proposes that intentions correlate strongly with behaviour.<sup>46</sup> In practice, however, although most people would recommend seeking professional help for mental problems,<sup>47</sup> or report an intention to seek help when affected by mental problems themselves,<sup>48</sup> a considerably lower proportion actually sought it.<sup>8</sup> Stigma might be one reason for not putting help-seeking intentions into action. However, only active help-seeking will reduce the burden of the disorder. We conducted, for the first time, a systematic review and meta-analysis to estimate the association of the four types of stigma with active help-seeking in the general population. Additionally, we estimated the role of potential moderating study characteristics such as sample source or response rate.

**Method**

Our systematic review and meta-analysis was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (see online

supplement DS1).<sup>49</sup> Inclusion and exclusion criteria were specified and documented in advance by F.S.L. and N.S. (see online supplement DS2). We included only studies with general population rather than clinical samples to reduce potential selection bias towards active help-seeking. Quantitative, cross-sectional or longitudinal surveys examining the impact of at least one of the four stigma types on actual help-seeking were eligible. We searched three electronic databases (PubMed, PsycINFO and EMBASE) with no language restriction. The last search was carried out on 10 July 2015. Potentially relevant studies published in peer-reviewed journals since 1990 were identified using keywords (adapted to the respective database) related to mental disorder AND stigma AND help-seeking (see online supplement DS3 for full search strategies and details of keywords). We also scrutinised the reference lists of relevant papers,<sup>21–27</sup> and contacted expert researchers for potential additional studies.

### Study selection and data extraction

We screened the titles and abstracts of all studies that met the search criteria and then consulted the full text to determine eligibility. We revised the data extraction sheet during the extraction process until it was applicable to all studies. Authors N.S. and N.G. extracted data independently, with potential disagreements resolved by discussion with F.S.L.. Authors of eligible studies were contacted for additional information or missing data, if necessary. We extracted the following information:

- publication details: author, year of publication, location and time of survey, setting and design;
- source of study population: general population sample (GPS) or subgroups of GPS such as students or military personnel (further referred to as selective GPS samples), total number of survey participants, number of participants used in analyses, random selection and representativeness;
- stigma measure: scale/items, reliability of scale and classification into one of the five stigma types – four specific stigmas, and ‘general stigma’ (GenS) for studies that did not survey a distinct stigma but combined more than one type into a single variable;
- help-seeking time-frame: help-seeking within the past 12 months *v.* lifetime help-seeking;
- statistical method;
- results: effect size of association with corresponding confidence interval or coefficient of association with corresponding standard error and covariates.

If a study reported more than one stigma type, we extracted all of them. We used estimates from the fully adjusted models. We recorded the direction of the stigma measure (e.g. higher scores indicate more stigma) and its range, as well as the direction of the association. Finally, we rated the quality of reporting according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement,<sup>50</sup> with a higher number of reported items representing a higher quality score.

### Statistical analysis

The odds ratio (OR) for stigma effect on help-seeking was the main outcome. We calculated ORs and 95% confidence intervals if only regression coefficients and standard errors (s.e.) were provided. We combined ORs in random effect meta-analyses. We conducted separate meta-analyses for each stigma measure to detect their independent effect on help-seeking. ORs of studies reporting lower levels of stigma increasing (rather than higher

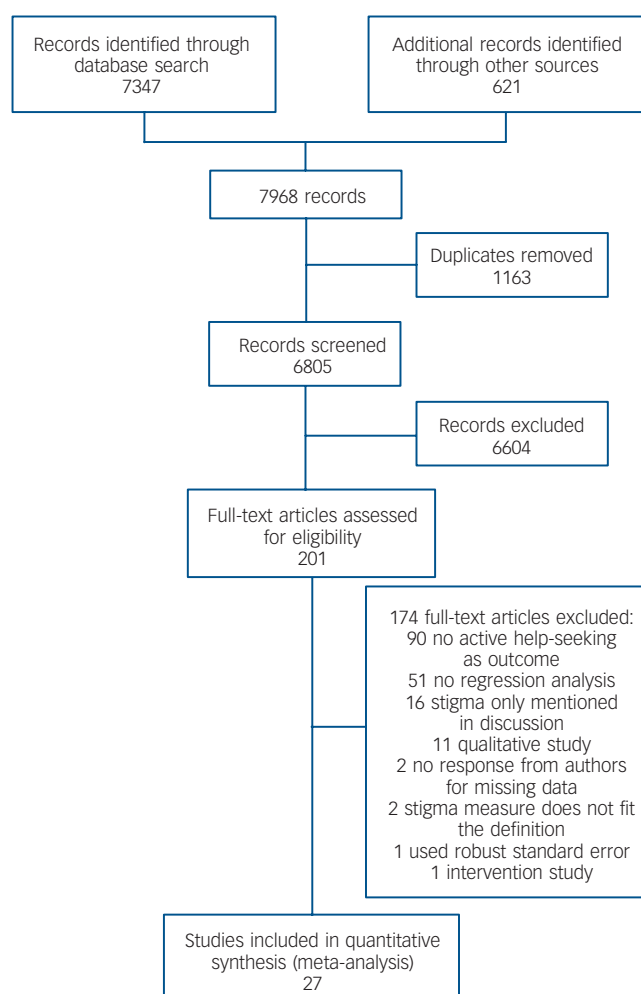
levels of stigma decreasing) the odds of help-seeking were inverted.<sup>51</sup> Heterogeneity was assessed using the  $I^2$  statistic; this provides information about the percentage of total variation across individual studies that cannot be explained by chance.<sup>52</sup> Values range from 0% to 100%, with higher values showing an increase in heterogeneity: 25%, 50% and 75% have been commonly used to represent low, moderate and high heterogeneity, respectively.<sup>52</sup> We additionally examined the heterogeneity using  $\tau^2$  statistics. Unlike  $I^2$ ,  $\tau^2$  is not affected by the number of participants included in the meta-analysis.<sup>53</sup> Its values range from 0 to infinity, with higher values indicating higher heterogeneity. Values of 0.04, 0.16 and 0.36 have been commonly used to represent low, moderate and high heterogeneity, respectively.<sup>54</sup> We assessed bias of small study effects with funnel plots and Egger’s test.<sup>55</sup> Subgroup analyses were pre-specified to investigate whether effects of stigma on help-seeking depended on specific study characteristics. We stratified analyses according to study population (GPS *v.* selective GPS sample), time of help-seeking (within the past 12 months *v.* lifetime), survey period (before 2006 *v.* 2006 and after), response rate (<70% *v.* ≥70%), quality of reporting (higher *v.* lower quality based on the median STROBE checklist score, with studies scoring 25 or above deemed higher quality) and setting (questionnaire *v.* interview). We defined two stratifications *post hoc* according to healthcare systems – private (USA) *v.* state-involved (other countries) – and study design (cross-sectional *v.* prospective). Stratification was only conducted if more than one study per group was found. All statistical analyses were done in Stata version 14 (Stata Corporation, College Station, Texas, USA).

## Results

We identified 7968 papers in the initial search of databases and the reference lists of previous reviews (Fig. 1).<sup>21–27</sup> After removing 1163 duplicates we screened the titles and abstracts of 6805 potentially eligible studies. We assessed the full text of 201 articles. We contacted authors of nine studies for additional data, five of whom responded and their findings were thus included. One of the studies with missing data provided data for only one stigma type,<sup>56</sup> and was therefore only partially included. Two were excluded owing to missing data. One study used robust standard errors (RSE), did not report CIs, and the authors were not able to provide parametric standard errors or confidence intervals. This study was excluded because the calculation of confidence intervals from RSEs leads to different results from those when standard errors are used. One study reported a lower CI limit equal to the estimate;<sup>64</sup> we assumed it to be a rounding problem and with lack of an author response used data ‘as is’. A final total of 27 studies were included in the meta-analyses.<sup>16,33,56–80</sup>

### General study characteristics

Altogether, the 27 studies included 31 677 participants aged 15 years or older. They included GPS (13 studies) or subsamples of non-clinical GPS (14 studies). Four studies used a prospective design. All studies but one, from Singapore,<sup>75</sup> were conducted in Western societies (Europe, Australia or USA). Included studies investigated at least one of the four types of stigma, but varied greatly in their assessment (online supplement DS4). Thirteen assessed PublicS, with six of them using the Perceived Devaluation Discrimination (D-D) Scale,<sup>32</sup> or its adaptation.<sup>81</sup> Of the six studies that investigated PersonS, two used a social distance scale and two employed an adaptation of the D-D scale (‘most people’ replaced with ‘I’). Three of the five studies investigating SelfS used a single-item assessment. Four of the 13 studies investigating



**Fig. 1** PRISMA flowchart of selection of eligible studies, with reasons for full-text exclusion.

HelpA used Fischer's Attitudes Towards Seeking Professional Psychological Help scale,<sup>43</sup> and two used a single item scale. Seven studies used a non-specific general stigma measure (see online Table DS1). All studies reported help-seeking from a formal, professional source such as a psychiatrist, psychotherapist or general practitioner. Only one study also investigated informal, lay sources of help, such as family or a priest. To improve the homogeneity of our outcome measure we only extracted data for formal, professional sources. Twenty studies reported recent help-seeking (within the past 12 months), seven reported lifetime help-seeking and one study reported both.<sup>64</sup> From the latter we extracted only data for lifetime help-seeking.

### Influence of stigma type on help-seeking

Figure 2 shows the results of the five random effect meta-analyses for each of the stigma types, as well as general stigma. Negative HelpA (OR = 0.80, 95% CI 0.73–0.88) and higher PersonS (OR = 0.82, 95% CI 0.69–0.98) were associated with less active help-seeking for mental health problems. Higher SelfS (OR = 0.88, 95% CI 0.76–1.03) showed an indication of less active help-seeking, but the results were not statistically significant. PublicS (OR = 0.97, 95% CI 0.93–1.02) and the unspecific GenS (OR = 0.98, 95% CI 0.84–1.15) were not associated with active help-seeking. There was substantial between-study heterogeneity in each of the meta-analyses, with  $I^2$  ranging from 58% for PublicS to 91% for PersonS. Between-study variance  $\tau^2$ , by

contrast, was low to moderate,<sup>81,82</sup> ranging from 0.003 for PublicS to 0.044 for PersonS. Only HelpA showed evidence of small-study bias (Egger's test,  $P < 0.01$ ; all other stigma measures  $P > 0.294$ ; see online figure DS1 for funnel plots and  $P$  values).

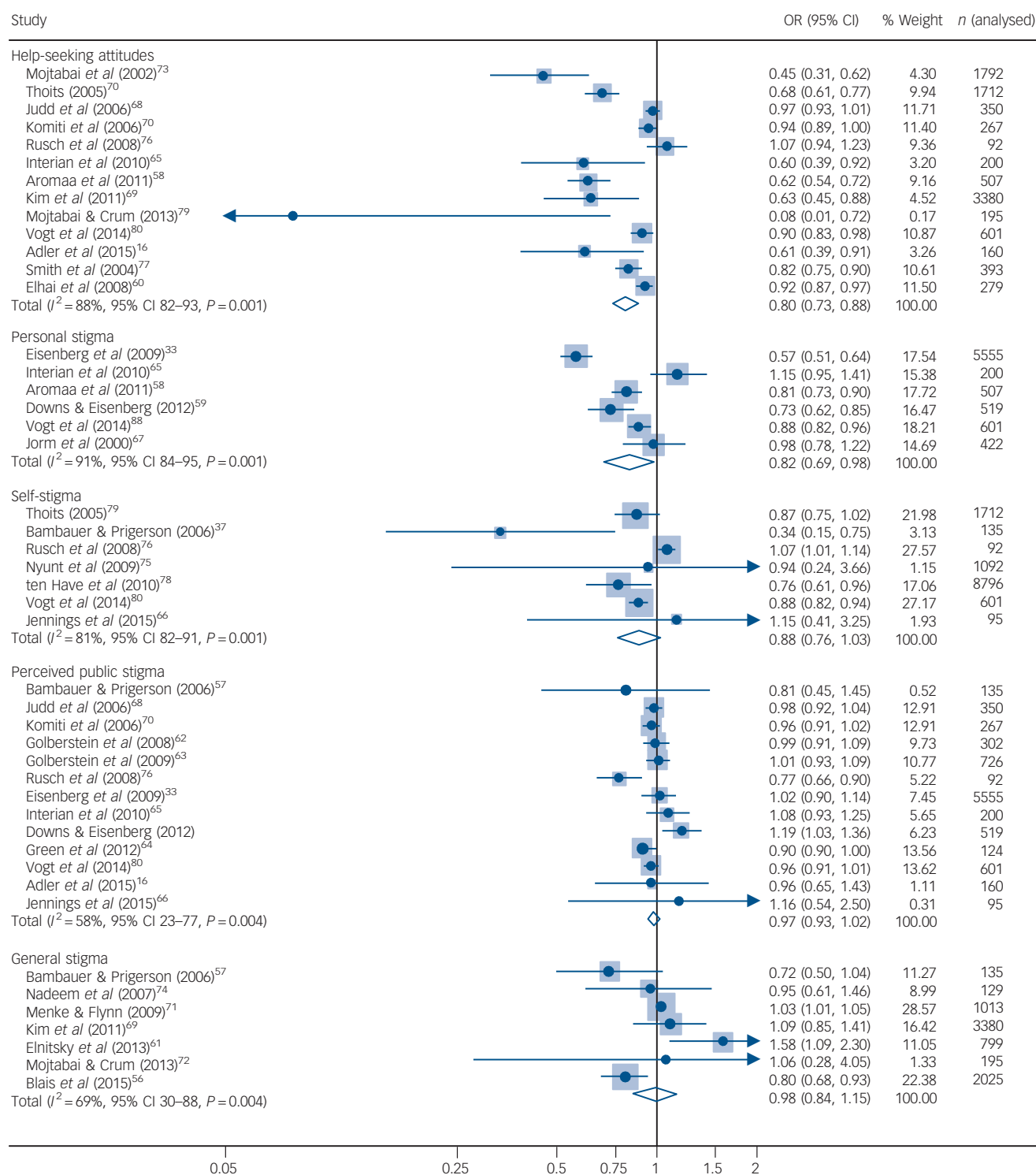
### Subgroup analyses

The stratified meta-analyses for the most part did not demonstrate any major influence of study characteristics (Fig. 3; online supplement DS5). Associations between HelpA and help-seeking were weakly influenced by type of study population, time of help-seeking, setting, response rate, design and quality of reporting. We found stronger negative associations in surveys with random *v.* selective general population samples, recent *v.* lifetime help-seeking, personal assessments *v.* questionnaires, higher *v.* lower response rates, prospective *v.* cross-sectional design and lower *v.* higher reporting quality. Associations between SelfS and help-seeking were weakly influenced by study setting, survey period and response rate. We found stronger negative associations in surveys with personal assessments *v.* questionnaires, those conducted before *v.* after 2006, and with higher *v.* lower response rates. There was a small effect of year of study publication on the association between GenS and help-seeking, with older studies reporting slightly stronger effects. Associations between PersonS and help-seeking were weakly influenced by study design, with cross-sectional studies reporting negative associations whereas prospective studies did not report significant associations. Stratification by the country's type of healthcare insurance did not show any effect. Results of stratified analyses of PublicS and PersonS were robust across all the investigated strata. A decline in between-study heterogeneity was observed in some stratification analyses. None of the stratification analyses could fully explain the observed heterogeneity in all of the associations between stigma types and help-seeking.

## Discussion

Our results confirm the notion that stigma related to mental illness or mental health services is directly associated with less active help-seeking for mental problems in the general population. The strength of association depends on the type of stigma, rather than being the case for stigma in general. We found associations between less active help-seeking and participants' levels of HelpA and PersonS. SelfS showed insignificant associations. PublicS and unspecific GenS showed no association. These findings are in line with social psychological studies demonstrating that attitudes towards a behaviour are associated with engaging in the behaviour itself in other situations.<sup>84</sup> Persons with pronounced PersonS might try to avoid contact with the stigmatised group,<sup>85–87</sup> and therefore refrain from help-seeking. PublicS and SelfS failed to show significant associations, but both pointed to the expected direction of more stigma predicting less active help-seeking. The majority of studies surveying SelfS used a single item asking about a person's embarrassment when thinking about help-seeking for his or her mental health problems. Even though embarrassment/shame seems to be a barrier to help-seeking intentions,<sup>88</sup> it is unclear whether this facet of SelfS can fully capture this stigma type.<sup>89</sup> Although a recent systematic review found a small association between SelfS and help-seeking (intentions/recommendations and active),<sup>21</sup> the influence of SelfS on active help-seeking in the general population needs further exploration. To assess stigma related to mental illness and its impact on help-seeking, future studies using GenS might also consider assessing one of the more specific stigma types.

Although the four stigma types revealed independent effects on help-seeking, they are interrelated.<sup>66,90–94</sup> Self-stigma seems



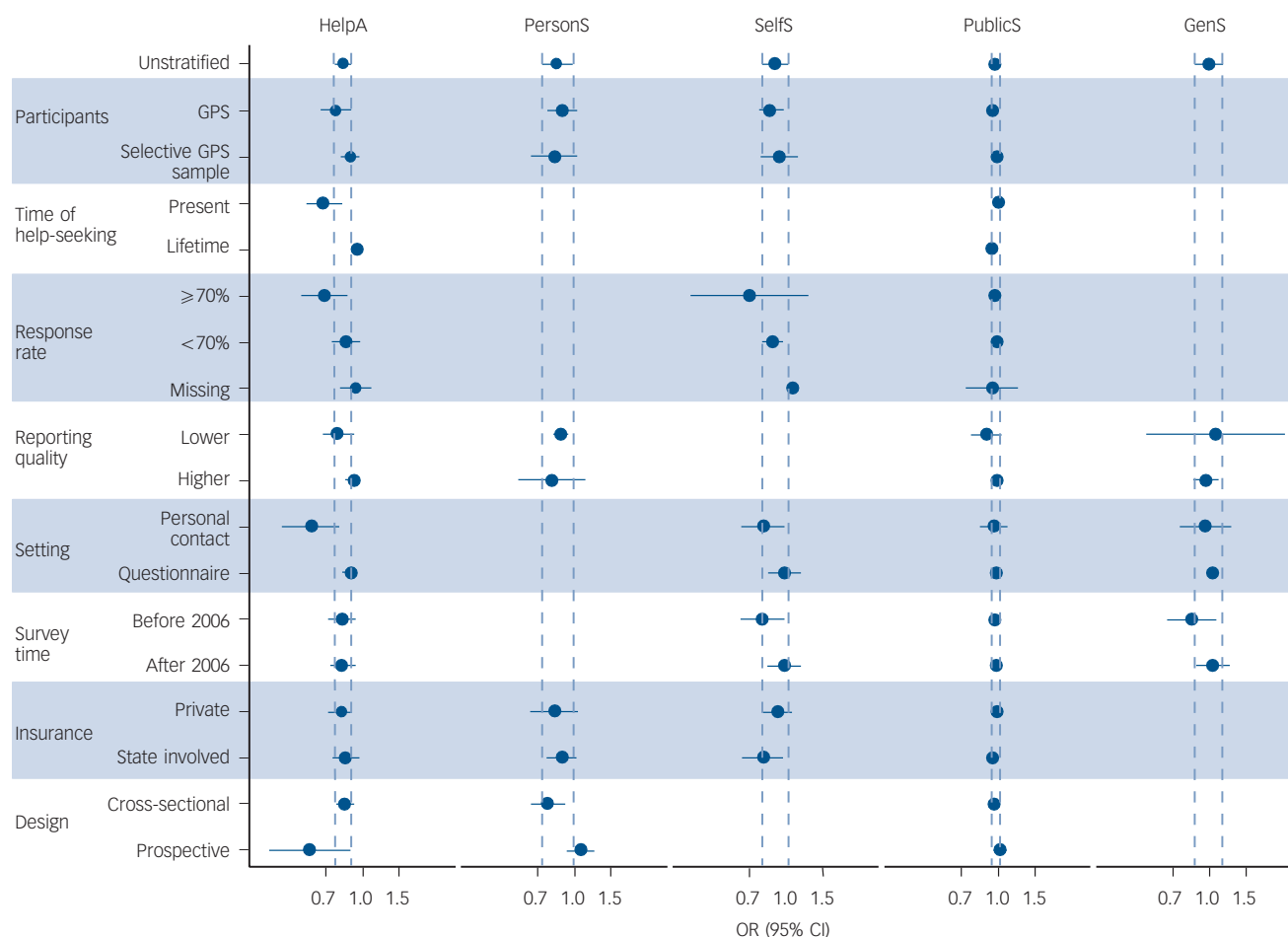
**Fig. 2** Forest plot of the results of meta-analyses of five stigma types on active help-seeking.

Odds ratios (OR) and 95% confidence intervals (CI) of individuals studies and pooled estimates of separate random effects meta-analyses. OR < 1 indicates negative associations between stigma or attitudes and help-seeking, i.e. higher levels of stigma are associated with less help-seeking. Estimates of between-study variance:  $\tau^2 = 0.018$  for HelpA,  $\tau^2 = 0.044$  for PersonS and  $\tau^2 = 0.023$  for GenS. The study by ten Have *et al* (2010) estimated relative risk ratio; OR estimate was not reported and not available from study authors.

to arise from an individual's own attitudes towards people with mental illness, as well as from (perceived) public stigma.<sup>66,89–91</sup> Perceived public stigma, personal stigma and self-stigma seem to predict attitudes towards help-seeking.<sup>66,92–95</sup> Furthermore, studies have suggested that stigma is associated with a low perceived need for help,<sup>66,96,97</sup> and a strong desire to handle the problem on one's own.<sup>98</sup> These two factors were proposed as important barriers in considering delayed or no help-seeking.<sup>97,98</sup> Future studies might

consider them as additional moderators of active help-seeking and in interaction with stigmatising attitudes.<sup>66</sup> It is crucial to understand the complexity of various types of stigma, their role in help-seeking for mental health problems, and their direct impact on mental problems such as suicidality,<sup>99</sup> in order to develop efficient public campaigns promoting help-seeking.

Several anti-stigma and information campaigns aiming to improve people's knowledge about mental illness (mental health



**Fig. 3** Forest plot of the results of stratified meta-analyses of five stigma types on active help-seeking.

Pooled estimates (odds ratio; OR) and 95% confidence interval (CI) of each strata are reported. Dashed lines represent 95% CI of non-stratified analyses (top row). GenS, general stigma; HelpA, help-seeking attitude; PersonS, personal stigma; PublicS, perceived public stigma; SelfS, self-stigma. OR < 1 indicates negative associations between stigma or attitudes and help-seeking, i.e. higher levels of stigma are associated with less help-seeking.

literacy) and to reduce stigma associated with mental illness have been conducted in recent years.<sup>100</sup> Whereas knowledge about the causes and treatment of mental illness seemed to improve over time and after campaigns,<sup>101–104</sup> reducing negative attitudes has proved to be more difficult.<sup>102</sup> Only 7% of the world population reported a belief that mental illness can be overcome,<sup>105</sup> and those most reluctant to seek help perceived the lowest benefits in engaging in this behaviour.<sup>106</sup> To promote help-seeking, findings from these meta-analyses suggest that campaigns should address negative personal attitudes by strengthening beliefs in the treatability of mental illness. Advanced, biologically oriented mental health literacy,<sup>107</sup> and activation of fear due to media reports,<sup>108</sup> can increase the desire for social distance towards people with mental illness. Therefore, the content of campaigns should be chosen thoughtfully to avoid unintended effects.<sup>109</sup>

### Future studies

Subgroup analyses suggested that associations between stigma and help-seeking can depend on certain study characteristics, in particular response rate and assessment setting. Higher response rates were generally associated with stronger negative effects of stigma. As higher response rates can reduce a potential non-responder bias,<sup>110</sup> they lead to more reliable results.<sup>111</sup> Consequently, reporting of response rates is crucial for assessing the validity and reliability of research findings,<sup>111</sup> which should be considered in future surveys. With regard to differences in

setting, face-to-face assessments were associated with stronger negative effects than were self-reports by questionnaire. Since the expression of stigmatising attitudes towards people with mental illness or towards mental health services might be affected by social desirability bias,<sup>112</sup> this is a surprising finding. Social desirability should have a greater role in personal contact. Surveys investigating social taboos (such as stigmatising attitudes) showed increased levels of response accuracy when data were assessed using self-administration (such as questionnaires), compared with interviewer administration.<sup>112</sup> Questionnaires might therefore be more suitable when researching stigma. In our analyses three out of four studies with personal assessment reported high response rates;<sup>72,73,79</sup> the fourth did not report a response rate.<sup>65</sup> Four studies using questionnaires reported low rates,<sup>58,67,77,80</sup> two reported none,<sup>60,76</sup> and only three reported high response rates.<sup>16,69,70</sup> Inspection of single study effects indicates that across these questionnaire studies, those with high response rates reported a stronger negative association. Sampling bias associated with lower response rates might therefore have a more crucial role in detecting associations between stigma and active help-seeking than the mode of assessment.

The association between HelpA and help-seeking was stronger when recent rather than lifetime help-seeking was considered. Furthermore, the association between HelpA and help-seeking was stronger in prospective studies, whereas the association between PersonS and help-seeking disappeared in prospective studies. These results indicate the importance of a timely



association between current attitudes and active help-seeking. Past help-seeking might shape a person's attitude towards help-seeking. For future help-seeking, only attitudes towards help-seeking but not personal attitudes towards people with a mental illness seem to be obstructive. More prospective studies of stigma and help-seeking are needed to disentangle this interplay and to overcome the problem of reciprocal or reversed causation in cross-sectional studies.

## Strengths and limitations

This is the first meta-analysis to extricate the influence of types of stigma on active help-seeking, focusing on the general population (the main target group of efforts to increase help-seeking) and considering study characteristics as potential moderators. However, our study has some limitations. We could have missed relevant studies owing to publication bias, although only HelpA showed some evidence of possible small-study bias. Several characteristics of the studies could have contributed to observed heterogeneity between them: studies used a large variety of stigma measures, differing in reliability and number of response categories. There was little information on exact operationalisation of stigma measures in the analyses; even if the number of categories was reported, it was often not specified whether stigma measures were used as dichotomous, categorical or continuous predictors, whether a cut-off for continuous measures was applied or whether the number of categories was collapsed. Future studies should report not only which stigma measure was used but also how it was handled during the analyses, all of which can affect the association with outcomes. Most studies adjusted for age and gender but differed greatly in their remaining adjustments. Future studies should adjust for variables such as mental health literacy,<sup>19</sup> perceived need,<sup>95</sup> or desire to handle the problem on one's own,<sup>98</sup> which seem to influence mental health help-seeking. We would encourage additional reporting of unadjusted associations in future studies to allow better comparison and research synthesis. All studies were conducted in high-income, mostly Western countries. The results of these meta-analyses may not generalise to non-Western or low-income countries. Despite these limitations, our results reinforce efforts to challenge mental health-related stigma as a major goal for global mental health.<sup>113</sup> Its reduction might facilitate help-seeking by those affected by mental illness.

## Future research

The results confirmed the negative association between stigma and active help-seeking, underscoring the important differential role of stigma types, with a minor role of perceived public attitudes compared with the individual's own attitudes. Furthermore, sensitivity analyses highlighted the importance of a sufficiently high response rate, as well as the control of potential reciprocal causation, and point towards a smaller social desirability bias in interview studies than is commonly assumed. Future studies on the effect of stigma on help-seeking for mental problems in the general population should use questionnaires that differentially assess stigma types, employ a prospective design, take care to monitor and increase response rates, and assess potential confounders, such as an independent low perceived need for help or a strong desire to handle problems on one's own.<sup>66,95–98</sup> Well-designed general population studies are needed to develop and optimise campaigns promoting mental health by facilitating early help-seeking and fighting mental illness stigma.

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## References

- Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, et al. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *Lancet* 2013; **382**: 1575–86.
- Wittchen HU, Jacobi F, Rehm J, Gustavsson A, Svensson M, Jonsson B, et al. The size and burden of mental disorders and other disorders of the brain in Europe 2010. *Eur Neuropsychopharmacol* 2011; **21**: 655–79.
- Gustavsson A, Svensson M, Jacobi F, Allgulander C, Alonso J, Beghi E, et al. Cost of disorders of the brain in Europe 2010. *Eur Neuropsychopharmacol* 2011; **21**: 718–79.
- Reeves WC, Strine TW, Pratt LA, Thompson W, Ahluwalia I, Dhingra SS, et al. Mental illness surveillance among adults in the United States. *MMWR Surveill Summ* 2011; **60**: 1–32.
- Barrera AZ, Torres LD, Munoz RF. Prevention of depression: the state of the science at the beginning of the 21st Century. *Int Rev Psychiatry* 2009; **19**: 655–70.
- Bienvenu OJ, Ginsburg GS. Prevention of anxiety disorders. *Int Rev Psychiatry* 2009; **19**: 647–54.
- Waddell CK, Hua JM, Garland OM, Peters RD, McEwan K. Preventing mental disorders in children: a systematic review to inform policy-making. *Can J Public Health* 2007; **98**: 166–73.
- Wang PS, Angermeyer MC, Borges G, Bruffaerts R, Tat Chiu W, de Girolamo G, et al. Delay and failure in treatment seeking after first onset of mental disorders in the World Health Organization's World Mental Health Survey Initiative. *World Psychiatry* 2007; **6**: 177–85.
- Campion J, Bhui K, Bhugra D. European Psychiatric Association (EPA) guidance on prevention of mental disorders. *Eur Psychiatry* 2012; **27**: 68–80.
- Bhatia SK, Bhatia SC. Childhood and adolescent depression. *Am Fam Physician* 2007; **75**: 73–80.
- Kessler RC, Foster CL, Saunders WB, Stang PE. Social consequences of psychiatric disorders, I: Educational attainment. *Am J Psychiatry* 1995; **152**: 1026–32.
- Mezuk B, Eaton WW, Albrecht S, Golden SH. Depression and type 2 diabetes over the lifespan: a meta-analysis. *Diabetes Care* 2008; **31**: 2383–90.
- Rugulies R. Depression as a predictor for coronary heart disease. *Am J Prev Med* 2002; **23**: 51–61.
- World Health Organization. *Prevention of Mental Disorders: Effective Interventions and Policy Options: Summary Report*. WHO, 2004.
- World Health Organization. *Promoting Mental Health: Concepts, Emerging Evidence, Practice: Summary Report*. WHO, 2004.
- Adler AB, Britt TW, Riviere LA, Kim PY, Thomas JL. Longitudinal determinants of mental health treatment-seeking by US soldiers. *Br J Psychiatry* 2015; **207**: 346–50.
- Andrade LH, Alonso J, Mneimneh Z, Wells JE, Al-Hamzawi A, Borges G, et al. Barriers to mental health treatment: results from the WHO World Mental Health surveys. *Psychol Med* 2014; **44**: 1303–17.
- Chen LY, Crum RM, Martins SS, Kaufmann CN, Strain EC, Mojtabai R. Service use and barriers to mental health care among adults with major depression and comorbid substance dependence. *Psych Serv* 2013; **64**: 863–70.
- Gulliver A, Griffiths KM, Christensen H. Perceived barriers and facilitators to mental health help-seeking in young people: a systematic review. *BMC Psychiatry* 2010; **10**: 113–22.
- Mojtabai R, Olfson M, Sampson NA, Jin R, Druss B, Wang PS, et al. Barriers to mental health treatment: results from the National Comorbidity Survey Replication. *Psychol Med* 2011; **41**: 1751–61.

- 21 Clement S, Schauman O, Graham T, Maggioni F, Evans-Lacko S, Bezborodovs N, et al. What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychol Med* 2015; **45**: 11–27.
- 22 Corrigan PW. How stigma interferes with mental health care. *Am Psychol* 2004; **59**: 614–25.
- 23 Corrigan PW, Druss BG, Perlick DA. The impact of mental illness stigma on seeking and participating in mental health care. *Psychol Sci Public Interest* 2014; **15**: 37–70.
- 24 Gary FA. Stigma: barrier to mental health care among ethnic minorities. *Issues Ment Health Nurs* 2009; **26**: 979–99.
- 25 Schomerus G, Angermeyer MC. Stigma and its impact on help-seeking for mental disorders: what do we know? *Epidemiol Psychiatr Soc* 2008; **17**: 31–7.
- 26 Sharp ML, Fear NT, Rona RJ, Wessely S, Greenberg N, Jones N, et al. Stigma as a barrier to seeking health care among military personnel with mental health problems. *Epidemiol Rev* 2015; **37**: 144–62.
- 27 Thornicroft G. Stigma and discrimination limit access to mental health care. *Epidemiol Psychiatr Soc* 2008; **17**: 14–9.
- 28 Rusch N, Corrigan PW. Stigma, discrimination and mental health. In *Public Mental Health. Global Perspectives* (eds L Knifton, N Quinn): 94–108. Open University Press, 2013.
- 29 Corrigan PW, Kerr A, Knudsen L. The stigma of mental illness: explanatory models and methods for change. *Appl Prev Psychol* 2005; **11**: 179–90.
- 30 Link BG, Yang LH, Phelan JC, Collins PY. Measuring mental illness stigma. *Schizophr Bull* 2004; **30**: 511–41.
- 31 Vogel DL, Wade NG, Haake S. Measuring the self-stigma associated with seeking psychological help. *J Couns Psychol* 2006; **53**: 325–37.
- 32 Link BG. Understanding labeling effects in the area of mental disorders: an assessment of the effect of expectations of rejection. *Am Sociol Rev* 1987; **52**: 96–112.
- 33 Eisenberg D, Downs MF, Golberstein E, Zivin K. Stigma and help seeking for mental health among college students. *Med Care Res Rev* 2009; **66**: 522–41.
- 34 Griffiths KM, Christensen H, Jorm AF, Evans K, Groves C. Effect of web-based depression literacy and cognitive-behavioural therapy interventions on stigmatising attitudes to depression. Randomised controlled trial. *Br J Psychiatry* 2004; **185**: 342–9.
- 35 Griffiths KM, Nakane Y, Christensen H, Yoshioka K, Jorm AF, Nakane H. Stigma in response to mental disorders: a comparison of Australia and Japan. *BMC Psychiatry* 2006; **6**: 21–33.
- 36 Reavley NJ, Jorm AF. Stigmatising attitudes towards people with mental disorders: changes in Australia over 8 years. *Psychiatry Res* 2012; **197**: 302–6.
- 37 Schomerus G, Matschinger H, Angermeyer MC. The stigma of psychiatric treatment and help-seeking intentions for depression. *Eur Arch Psychiatry Clin Neurosci* 2009; **259**: 298–306.
- 38 Angermeyer MC, Holzinger A, Carta MG, Schomerus G. Biogenetic explanations and public acceptance of mental illness: systematic review of population studies. *Br J Psychiatry* 2011; **199**: 367–72.
- 39 Corrigan PW, Watson AC. The paradox of self-stigma and mental illness. *Clin Psychol Sci Pract* 2002; **9**: 35–53.
- 40 Corrigan PW, Watson AC, Barr L. The self-stigma of mental illness: implications for self-esteem and self-efficacy. *J Soc Clin Psychol* 2006; **25**: 875–84.
- 41 Livingston JD, Boyd JE. Correlates and consequences of internalized stigma for people living with mental illness: a systematic review and meta-analysis. *Soc Sci Med* 2010; **71**: 2150–61.
- 42 Ritsher JB, Phelan JC. Internalized stigma predicts erosion of morale among psychiatric outpatients. *Psychiatry Res* 2004; **129**: 257–65.
- 43 Fischer EH, Turner JI. Orientations to seeking professional help: development and research utility of an attitude scale. *J Consult Clin Psychol* 1970; **35**: 79–90.
- 44 Stevelink SAM, Wu IC, Voorend CG, van Brakel WH. The psychometric assessment of internalized stigma instruments: a systematic review. *Stigma Res Action* 2012; **2**: 100–18.
- 45 Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process* 1991; **50**: 179–211.
- 46 McEachan RRC, Conner M, Taylor NJ, Lawton RJ. Prospective prediction of health-related behaviours with the theory of planned behaviour: a meta-analysis. *Health Psychol Rev* 2011; **5**: 97–144.
- 47 Holzinger A, Matschinger H, Angermeyer MC. What to do about depression? Help-seeking and treatment recommendations of the public. *Epidemiol Psychiatr Sci* 2011; **20**: 163–69.
- 48 Lally J, O’Conghaile A, Quigley S, Bainbridge E, McDonald C. Stigma of mental illness and help-seeking intention in university students. *Psychiatrist* 2013; **37**: 253–60.
- 49 Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gotzsche PC, Ioannidis JP, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *Ann Intern Med* 2009; **151**: W65–94.
- 50 Von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, et al. The Strengthening of Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Prev Med* 2007; **45**: 247–51.
- 51 Osborne JW. Bringing balance and technical accuracy to reporting odds ratios and the results of logistic regression analyses. In *Best Practices in Quantitative Methods* (ed JW Osborne): 385–90. Sage, 2008.
- 52 Higgins JP, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *BMJ* 2003; **327**: 557–60.
- 53 Rucker G, Schwarzer G, Carpenter JR, Schumacher M. Undue reliance on  $I^2$  in assessing heterogeneity may mislead. *BMC Med Res Methodol* 2008; **8**: 79–87.
- 54 Da Costa BR, Juni P. Systematic reviews and meta-analyses of randomized trials: principles and pitfalls. *Eur Heart J* 2014; **35**: 3336–45.
- 55 Sterne JA, Egger M. Funnel plots for detecting bias in meta-analysis: guidelines on choice of axis. *J Clin Epidemiol* 2001; **54**: 1046–55.
- 56 Blais RK, Tsai J, Southwick SM, Pietrzak RH. Barriers and facilitators related to mental health care use among older veterans in the United States. *Psych Serv* 2015; **66**: 500–6.
- 57 Bambauer KZ, Prigerson HG. The Stigma Receptivity Scale and its association with mental health service use among bereaved older adults. *J Nerv Ment Dis* 2006; **194**: 139–41.
- 58 Aromaa E, Tolvanen A, Tuuluri J, Wahlbeck K. Personal stigma and use of mental health services among people with depression in a general population in Finland. *BMC Psychiatry* 2011; **11**: 52–7.
- 59 Downs MF, Eisenberg D. Help seeking and treatment use among suicidal college students. *J Am Coll Health* 2012; **60**: 104–14.
- 60 Elhai JD, Schweinle W, Anderson SM. Reliability and validity of the attitudes toward seeking professional psychological help scale-short form. *Psychiatry Res* 2008; **159**: 320–9.
- 61 Elnitsky CA, Chapman PL, Thurman RM, Pitts BL, Figley C, Unwin B. Gender differences in combat medic mental health services utilization, barriers, and stigma. *Mil Med* 2013; **178**: 775–84.
- 62 Golberstein E, Eisenberg D, Gollust SE. Perceived stigma and mental health care seeking. *Psych Serv* 2008; **59**: 392–9.
- 63 Golberstein E, Eisenberg D, Gollust SE. Perceived stigma and help-seeking behavior: longitudinal evidence from the healthy minds study. *Psych Serv* 2009; **60**: 1254–6.
- 64 Green AC, Hunt C, Stain HJ. The delay between symptom onset and seeking professional treatment for anxiety and depressive disorders in a rural Australian sample. *Soc Psychiatry Psychiatr Epidemiol* 2012; **47**: 1475–87.
- 65 Interian A, Ang A, Gara MA, Link BG, Rodríguez MA, Vega WA. Stigma and depression treatment utilization among Latinos: utility of four stigma measures. *Psych Serv* 2010; **61**: 373–9.
- 66 Jennings KS, Cheung JH, Britt TW, Goguen KN, Jeffries SM, Peasley AL, et al. How are perceived stigma, self-stigma, and self-reliance related to treatment-seeking? A three-path model. *Psychiatr Rehabil J* 2015; **38**: 109–16.
- 67 Jorm AF, Medway J, Christensen H, Korten AE, Jacomb PA, Rodgers B. Attitudes towards people with depression: effects on the public’s help-seeking and outcome when experiencing common psychiatric symptoms. *Aust NZ J Psychiatry* 2000; **34**: 612–8.
- 68 Judd F, Jackson H, Komiti A, Murray G, Fraser C, Grieve A, et al. Help-seeking by rural residents for mental health problems: the importance of agrarian values. *Aust NZ J Psychiatry* 2006; **40**: 769–76.
- 69 Kim PY, Britt TW, Klocko RP, Riviere LA, Adler AB. Stigma, negative attitudes about treatment, and utilization of mental health care among soldiers. *Mil Psychol* 2011; **23**: 65–81.
- 70 Komiti A, Judd F, Jackson H. The influence of stigma and attitudes on seeking help from a GP for mental health problems. *Soc Psychiatry Psychiatr Epidemiol* 2006; **41**: 738–45.
- 71 Menke R, Flynn H. Relationships between stigma, depression, and treatment in white and African American primary care patients. *J Nerv Ment Dis* 2009; **197**: 407–11.
- 72 Mojtabai R, Crum RM. Perceived unmet need for alcohol and drug use treatments and future use of services: results from a longitudinal study. *Drug Alcohol Depend* 2013; **127**: 59–64.

- 73 Mojtabai R, Olfson M, Mechanic D. Perceived need and help-seeking in adults with mood, anxiety, or substance use disorders. *Arch Gen Psychiatry* 2002; **59**: 77–84.
- 74 Nadeem E, Lange JM, Edge D, Fongwa M, Belin T, Miranda J. Does stigma keep poor young immigrant and US-born black and Latina women from seeking mental health care? *Psych Serv* 2007; **58**: 1547–54.
- 75 Nyunt MS, Chiam PC, Kua EH, Ng TP. Determinants of mental health service use in the national mental health survey of the elderly in Singapore. *Clin Pract Epidemiol Ment Health* 2009; **5**: 2–10.
- 76 Rusch LC, Kanter JW, Manos RC, Weeks CE. Depression stigma in a predominantly low income African American sample with elevated depressive symptoms. *J Nerv Ment Dis* 2008; **196**: 919–22.
- 77 Smith LD, McGovern RJ, Peck PL. Factors contributing to the utilization of mental health services in a rural setting. *Psychol Rep* 2004; **95**: 435–42.
- 78 Ten Have M, de Graaf R, Ormel J, Vilagut G, Kovess V, Alonso J, et al. Are attitudes towards mental health help-seeking associated with service use? Results from the European Study of Epidemiology of Mental Disorders. *Soc Psychiatry Psychiatr Epidemiol* 2010; **45**: 153–63.
- 79 Thoits PA. Differential labeling of mental illness by social status: a new look at an old problem. *J Health Soc Behav* 2005; **46**: 102–19.
- 80 Vogt D, Fox AB, Di Leone BA. Mental health beliefs and their relationship with treatment seeking among US OEF/OIF veterans. *J Trauma Stress* 2014; **27**: 307–13.
- 81 Spiegelhalter DJ, Abrams KR, Myles JP. *Bayesian Approaches to Clinical Trials and Health-Care Evaluation*. Wiley, 2004.
- 82 Sarikaya H, da Costa BR, Baumgartner RW, Duclos K, Touze E, de Bray JM, et al. Antiplatelets versus anticoagulants for the treatment of cervical artery dissection: Bayesian meta-analysis. *PLoS ONE* 2013; **8**: e72697.
- 83 Wrigley S, Jackson H, Judd F, Komiti A. The role of stigma and attitudes towards help-seeking from a GP for mental health problems in a rural town. *Aust NZ J Psychiatry* 2009; **39**: 14–21.
- 84 Ajzen I, Fishbein M. Attitude-behavior relations: a theoretical analysis and review of empirical research. *Psychol Bull* 1977; **84**: 888–918.
- 85 Allport GW. *The Nature of Prejudice*. Addison-Wesley, 1954.
- 86 Brewer MB. The psychology of prejudice: ingroup love or outgroup hate? *J Soc Issues* 1999; **55**: 429–44.
- 87 Voci A. The link between identification and in-group favoritism: effect of threat to social identity and trust-related emotions. *Br J Soc Psychol* 2006; **45**: 265–84.
- 88 Rusch N, Muller M, Ajdacic-Gross V, Rodgers S, Corrigan PW, Rossler W. Shame, perceived knowledge and satisfaction associated with mental health as predictors of attitude patterns towards help-seeking. *Epidemiol Psychiatr Sci* 2014; **23**: 177–87.
- 89 Omori Y, Mori C, White AH. Self-stigma in schizophrenia: a concept analysis. *Nurs Forum* 2014; **49**: 259–66.
- 90 Corrigan PW. Mental health stigma as social attribution: implications for research methods and attitude change. *Clin Psychol Sci Pract* 2000; **7**: 48–67.
- 91 Link BG, Phelan JC. Conceptualizing stigma. *Annu Rev Sociol* 2001; **27**: 363–85.
- 92 Corrigan PW, Bink AB, Schmidt A, Jones N, Rusch N. What is the impact of self-stigma? Loss of self-respect and the 'why try' effect. *J Ment Health* 2015; **25**: 10–5.
- 93 Cooper AE, Corrigan PW, Watson AC. Mental illness stigma and care seeking. *J Nerv Ment Dis* 2003; **191**: 339–41.
- 94 Coppens E, Van Audenhove C, Scheerder G, Arensman E, Coffey C, Costa S, et al. Public attitudes toward depression and help-seeking in four European countries: baseline survey prior to the OSPI-Europe intervention. *J Affect Disord* 2013; **150**: 320–29.
- 95 Vogel DL, Wade NG, Haake S. Measuring the self-stigma associated with seeking psychological help. *J Couns Psychol* 2006; **53**: 325–37.
- 96 Preville M, Mechakra TS, Vasiladis HM, Quesnel L, Gontijo-Guerra S, Lamoureux-Lamarche C, et al. Association between perceived social stigma against mental disorders and use of health services for psychological distress symptoms in the older adult population: validity of the STIG scale. *Aging Ment Health* 2015; **19**: 464–74.
- 97 Kanehara A, Umeda M, Kawakami N. Barriers to mental health care in Japan: results from the World Mental Health Japan Survey. *Psychiatry Clin Neurosci* 2015; **69**: 523–33.
- 98 Andrade LH, Alonso J, Mneimneh Z, Wells JE, Al-Hamzawi A, Borges G, et al. Barriers to mental health treatment: results from the WHO World Mental Health surveys. *Psychol Med* 2014; **44**: 1303–17.
- 99 Oexle N, Rusch N, Vierung S, Wyss C, Seifritz E, Xu Z, et al. Self-stigma and suicidality: a longitudinal study. *Eur Arch Psychiatry Clin Neurosci* 2016; epub ahead of print.
- 100 Mehta N, Clement S, Marcus E, Stona AC, Bezborodovs N, Evans-Lacko S, et al. Evidence for effective interventions to reduce mental health-related stigma and discrimination in the medium and long term: systematic review. *Br J Psychiatry* 2015; **207**: 377–84.
- 101 Thornicroft C, Wyllie A, Thornicroft G, Mehta N. Impact of the 'Like Minds, Like Mine' anti-stigma and discrimination campaign in New Zealand on anticipated and experienced discrimination. *Aust NZ J Psychiatry* 2014; **48**: 360–70.
- 102 Angermeyer MC, Matschinger H, Schomerus G. Attitudes towards psychiatric treatment and people with mental illness: changes over two decades. *Br J Psychiatry* 2013; **203**: 146–51.
- 103 Evans-Lacko S, Henderson C, Thornicroft G, McCrone P. Economic evaluation of the anti-stigma social marketing campaign in England 2009–2011. *Br J Psychiatry* 2013; **202** (suppl 55): s95–101.
- 104 Yap MBH, Reavley N, Mackinnon AJ, Jorm AF. Psychiatric labels and other influences on young people's stigmatizing attitudes: findings from an Australian national survey. *J Affect Disord* 2013; **148**: 299–309.
- 105 Seeman N, Tang S, Brown AD, Ing A. World survey of mental illness stigma. *J Affect Disord* 2016; **190**: 115–21.
- 106 O'Connor PJ, Martin B, Weeks CS, Ong L. Factors that influence young people's mental health help-seeking behaviour: a study based on the Health Belief Model. *J Adv Nurs* 2014; **70**: 2577–87.
- 107 Schomerus G, Schwahn C, Holzinger A, Corrigan PW, Grabe HJ, Carta MG, et al. Evolution of public attitudes about mental illness: a systematic review and meta-analysis. *Acta Psychiatr Scand* 2012; **125**: 440–52.
- 108 Niederkrotenthaler T, Reidenberg DJ, Till B, Gould MS. Increasing help-seeking and referrals for individuals at risk for suicide by decreasing stigma: the role of mass media. *Am J Prev Med* 2014; **47**: 235–43.
- 109 Corrigan PW. Resolving mental illness stigma: should we seek normalcy or solidarity? *Br J Psychiatry* 2016; **208**: 314–5.
- 110 Asch DA, Jedrzejewski MK, Christakis NA. Response rates to mail surveys published in medical journals. *J Clin Epidemiol* 1997; **50**: 1129–36.
- 111 Baruch Y, Holtom BC. Survey response rate levels and trends in organizational research. *Hum Relat* 2008; **61**: 1139–60.
- 112 Krumpal I. Determinants of social desirability bias in sensitive surveys: a literature review. *Qual Quant* 2013; **47**: 2025–47.
- 113 Collins PY, Patel V, Joestl SS, March D, Insel TR, Daar AS. Grand challenges in global mental health. *Nature* 2011; **475**: 27–30.





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## **DS1**

### **Inclusion and exclusion criteria for meta-analysis**

#### **General criteria**

##### **Participants**

###### *Inclusion criteria:*

- General population samples
- Selective samples (such as only females or only elderly people or only one specific ethnical group) are included, as long as they were drawn from the general population and not from a clinical sample
- Student samples are included as long as they are from randomly selected or bigger students population and not from a clinical student sample
- Army samples are included as long as they are not from a selective clinical sample (soldiers that are in treatment for mental health related problems)

###### *Exclusion criteria:*

- Clinical samples, mental health patients
- Mental health professionals, general practitioners or other professionals working with people with mental illness

##### **Language**

###### *Inclusion criteria:*

- English
- German
- French
- Polish
- Spanish

###### *Exclusion criteria*

- Any other languages

##### **Study design, setting, type**

###### *Inclusion criteria:*

- Study published in peer reviewed journal
- Articles published between 1990 and July 2015
- Cross-sectional and longitudinal survey
- Quantitative studies
- Postal/internet questionnaire and/or interview with personal contact

###### *Exclusion criteria:*

- (evaluation) campaign / intervention / awareness studies with or without pre-post comparisons
- Reviews / meta-analysis / systematic reviews
- Qualitative studies
- Dissertations

##### **Statistical analysis**

###### *Inclusion criteria:*

- (logistic) regression (all studies that make a prediction of the influence of mental health related stigma on actual help-seeking)

###### *Exclusion criteria:*

- Group comparisons (Chi<sup>2</sup>, t-test, ANOVA etc.)
- Correlation studies
- SEM
- Studies with missing data, when authors did not reply to our e-mails

## **Predictor variable(s)**

### **Stigma**

#### *Inclusion criteria:*

- Stigmatized group: people with mental illness, mental illness patients
- self-stigma / internalized stigma
- perceived public stigma
- personal stigma / social distance
- attitudes toward help-seeking / treatment stigma
- general stigma measures that contain more than one of the former stigma categories
- barriers towards help-seeking if stigma barriers were separate predictor and if they fit one of the former stigma categories
- single item stigma measures are included if they fit one of the former stigma categories

#### *Exclusion criteria:*

- Any other stigmatized group (HIV/AIDS, cancer patients, transgender etc.)
- 'perceived need for mental health treatment' as a single measure for attitudes towards treatment
- 'belief in helpfulness of a treatment' as a single measure for attitudes towards treatment

## **Outcome variable**

### **Help-Seeking**

#### *Inclusion criterion:*

- Actual help-seeking (past/lifetime or present/within last year)
- Help-seeking from informal (e.g. family, friend, priest) or formal source (e.g. mental health specialist such as psychotherapist or psychiatrist, general practitioner)

#### *Exclusion criteria:*

- Help-seeking intentions
- Help-seeking recommendations (for themselves or for others)
- Perceived need for help-seeking
- Attitudes towards help-seeking
- Having unmet need
- Any other hypothetical help-seeking measures
- Help-seeking on behalf of another individual (e.g. family member)

## DS2

### Searching Database Keywords

**PubMed** (we used MeSH Terms for all keywords)

*Mental disorder related terms:*

"mental disorder" OR "mental health" OR "mental illness"

AND

*Help-seeking related terms:*

„help-seeking“ OR "help-seeking intentions" OR "willingness to use mental health service" OR "seeking mental health treatment" OR "attitudes to help-seeking" OR "attitudes to seeking mental health service" OR "treatment seeking" OR "barriers to treatment" OR "barriers to help-seeking" OR "help-seeking recommendation" OR "health behavio\*" OR "health education" OR "service use" OR "health care utilization" OR "health care"

AND

*Stigma related terms*

"stigma\*" OR "attitude" OR "discrimination" OR "social distance" OR "stereotyp\*" OR "emotional reaction" OR "devaluation" OR "dangerousness"

### PsycInfo/Ovid

*Mental disorder related terms:*

1. Mental disorder/
2. exp mental health/
3. 1 or 2

*Stigma related terms:*

4. exp stigma/
5. exp “mental illness (attitudes toward)“/ or exp attitudes/ or exp stereotyped attitudes/
6. exp stigma/ or exp “mental illness (attitudes toward)“/
7. exp prejudice
8. exp dangerousness
9. devaluation.mp.
10. 4 or 5 or 6 or 7 or 8 or 9

*Help-seeking related terms:*

11. exp mental health services/ or exp help seeking behavior/ or exp health care utilization/ or exp health care seeking behavior/
12. exp treatment barriers/
13. help-seeking.mp.
14. help-seeking recommendation.mp.
15. 11 or 12 or 13 or 14

*Terms combined:*

16. 3 and 10 and 15

## **EMBASE/MEDLINE**

### *Mental disorder related terms:*

"Mental disease"/exp OR "mental disease"

AND

### *Stigma related terms:*

"Stigma"/exp OR "stigma" OR "attitude"/exp OR "attitude" OR "social distance"/exp OR "social distance" OR "stereotype"/exp OR "stereotype" OR devaluation OR dangerousness OR prejudice

AND

### *Help-seeking related terms:*

"help seeking" OR "help-seeking intention" OR "attitudes to help-seeking" OR "treatment barriers" OR "help seeking barriers" OR "service use" OR "health care utilization" OR "help seeking recommendation"

**DS3 stigma instrument**

Source	Stigma scale / stigma barrier measure(s)	stigma type
Jorm <i>et al</i> (2000) <sup>67</sup>	Question: 'how do you think would person described in the vignette be in the long term compared to other people in the community?' 10 positive and negative outcomes such as 'to be violent', 'to have a good marriage' etc.	personal stigma
Mojtabai <i>et al</i> (2002) <sup>73</sup>	two items: 'how comfortable would you feel talking about personal problems?' and 'how embarrassing would it be if friends knew about professional help' (calculated sum score for both items)	general stigma measure
Smith <i>et al</i> (2004) <sup>77</sup>	Attitudes towards seeking professional psychological help (ATSPPH, Turner & Fischer 1970)	help-seeking attitudes
Thoits <i>et al</i> (2005) <sup>79</sup>	two items: (a) 'how comfortable would you feel talking about personal problems?' (b) 'how embarrassing would it be if friends knew about professional help' (both items separately)	(a) help-seeking attitudes (b) self-stigma
Bambauer <i>et al</i> (2006) <sup>57</sup>	Stigma Receptivity Scale (SRS, Prigerson 2003)	(a) general stigma measure (b) perceived public stigma (c) self-stigma
Judd <i>et al</i> (2006) <sup>68</sup>	(a) Perceived Stigma Scale (PSS, Wrigley <i>et al.</i> 2005; adapted from Perceived Discrimination Devaluation (PDD) Scale, Link, 1987/1989) (b) ATSPPH	(a) perceived public stigma (b) help-seeking attitudes
Komiti <i>et al</i> (2006) <sup>70</sup>	(a) PSS and (b) ATSPPH	(a) perceived public stigma (b) help-seeking attitudes
Nadeem <i>et al</i> (2007) <sup>74</sup>	3 barriers: 'being embarrassed', 'being afraid what others might think', and 'afraid that family members do not approve'	general stigma measure
Elhai <i>et al</i> (2008) <sup>60</sup>	Attitudes towards seeking professional psychological help - short form (ATSPPH-SF, Turner & Fischer 1970)	help-seeking attitudes
Golberstein <i>et al</i> (2008) <sup>62</sup>	adapted from 'Stigma Scale for Receiving Psychological Help (Pyne <i>et al.</i> 2004, Komiya <i>et al.</i> 2000)	perceived public stigma
Golberstein <i>et al</i> (2009) <sup>63</sup>	adapted from 'Stigma Scale for Receiving Psychological Help (Pyne <i>et al.</i> 2004, Komiya <i>et al.</i> 2000)	perceived public stigma
Rusch <i>et al</i> (2008) <sup>76</sup>	Depression Self-Stigma Scale (DSSS, Kanter <i>et al.</i> 2008)	(a) perceived public stigma (b) help-seeking attitudes (c) self-stigma
Eisenberg <i>et al</i> (2009) <sup>33</sup>	(a) PDD Scale (b) PDD Scale replacing 'most people' with 'I'	(a) perceived public stigma (b) personal stigma

Menke <i>et al</i> (2009) <sup>71</sup>	Link Stigma Scale (LSCS) Secrecy and PDD Subscales (Link et al. 1997)	general stigma measure
Nyunt <i>et al</i> (2009) <sup>75</sup>	one item: 'are you embarrassed or ashamed about personal mental ill health or emotional problems?'	self-stigma
Interian <i>et al</i> (2010) <sup>65</sup>	(a) PDD Scale (b) Stigma Concerns about Mental Health Care (SCMHC, Interian et al. 2010) (c) Social Distance Scale (SD, Angermeyer et al. 1997)	(a) perceived public stigma (b) help-seeking attitudes (c) personal stigma
ten Have <i>et al</i> (2010) <sup>78</sup>	one item: 'how embarrassed would you be if your friends knew you were getting prof help for an emotional problem?'	self-stigma
Aromaa <i>et al</i> (2011) <sup>58</sup>	(a) 16 statements integrating different stigma concepts (Aromaa et al. 2011) (b) Social Distance	(a) help-seeking attitudes (b) personal stigma
Kim <i>et al</i> (2011) <sup>69</sup>	17 barriers, found 3 factor with factor analysis, two of them were stigma-related	(a) general stigma measure (b) help-seeking attitudes
Downs & Eisenberg (2012) <sup>62</sup>	(a) PDD Scale (b) PDD Scale replacing 'most people' with 'I'	(a) perceived public stigma (b) personal stigma
Green <i>et al</i> (2012) <sup>64</sup>	PSS	perceived public stigma
Elnitsky <i>et al</i> (2013) <sup>61</sup>	stigma and barriers to care (developed by Hoge et al. 2004)	general stigma measure
Mojtabai & Crum (2013) <sup>72</sup>	27 barriers	(a) general stigma measure (b) help-seeking attitudes
Vogt <i>et al</i> (2014) <sup>80</sup>	Endorsed and Anticipated Stigma Inventory (EASI, Vogt et al. 2014)	(a) perceived public stigma (b) self-stigma (c) personal stigma (d) help-seeking attitudes
Adler <i>et al</i> (2015) <sup>16</sup>	17 items (11 originally from Hoge et al. 2004; 6 originally from Britt 2000 & Kim et al. 2011)	(a) perceived public stigma (b) help-seeking attitudes
Blais <i>et al</i> (2015) <sup>56</sup>	Perceived Stigma and Barriers to Care Scale (Britt, 2000)	(a) general stigma measure (b) help-seeking attitudes (missing data of this measure)
Jennings <i>et al</i> (2015) <sup>66</sup>	(a) Self-Stigma of Seeking Help Scale (SSOSH, Vogel et al. 2006) (b) Perceived stigma-TS (Jennings et al. 2015; 7 items adapted from Britt et al. 2008, 2014)	(a) self-stigma (b) perceived public stigma

**DS5 output stratification**

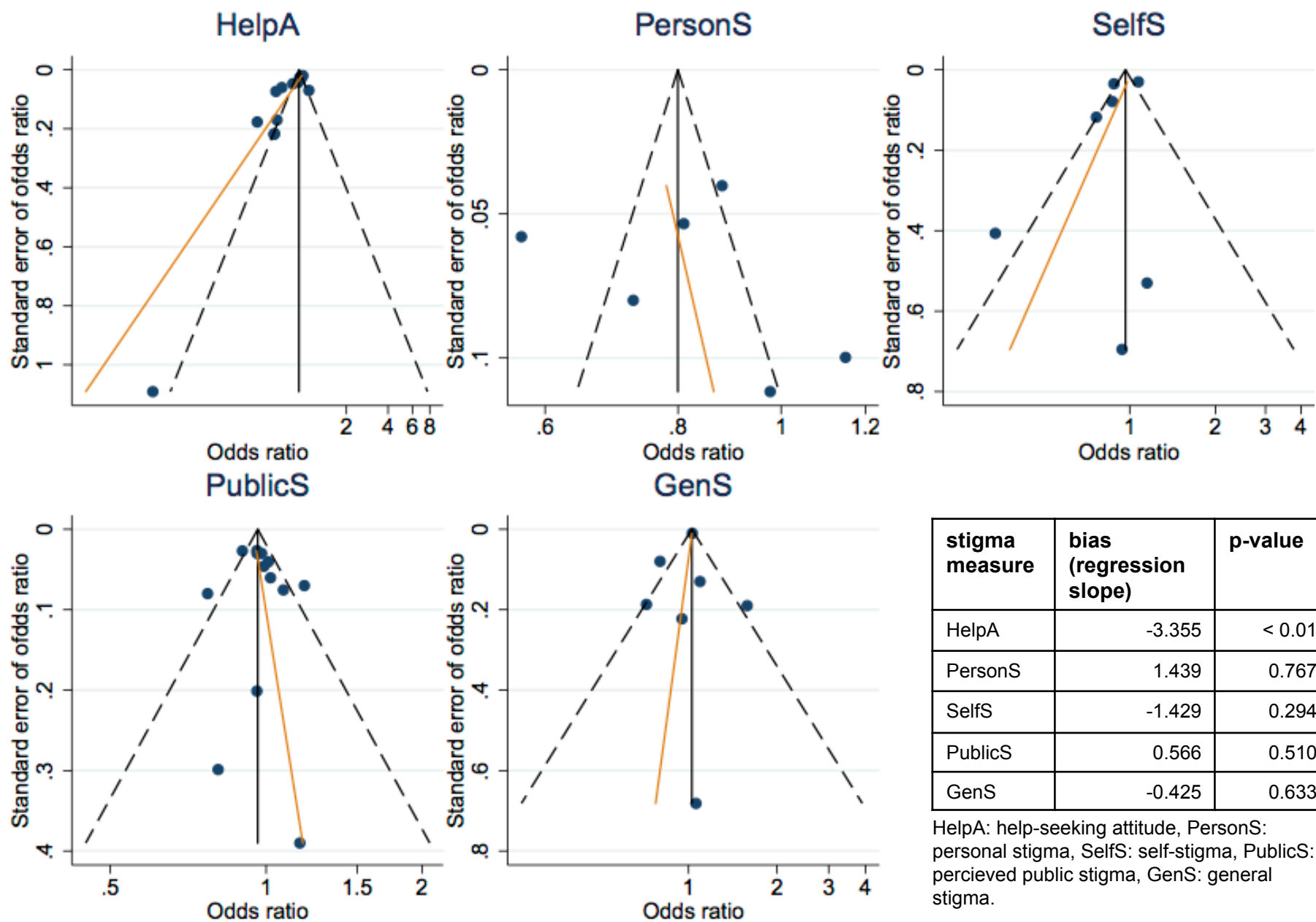
	personal stigma		help-seeking attitudes		self-stigma		perceived public stigma		general stigma	
Stratified by	OR (95%CI)	I <sup>2</sup> (p-value) / $\tau^2$	OR (95%CI)	I <sup>2</sup> (p-value) / $\tau^2$	OR (95%CI)	I <sup>2</sup> (p-value) / $\tau^2$	OR (95%CI)	I <sup>2</sup> (p-value) / $\tau^2$	OR (95%CI)	I <sup>2</sup> (p-value) / $\tau^2$
participant groups	GPS	0.87 (0.73-1.03) 56.2% (ns)/ 0.010	0.73* (0.63-0.87) 93.9% (p<0.001)/ 0.034	0.83* (0.73-0.95) 0% (ns) / 0.000	0.95 (0.90-1.00) 60.5% (ns)/ 0.001					
	selective sample	0.80 (0.61-1.04) 94.5% (p<0.05)/ 0.069	0.86* (0.78-0.95) 72.5% (p<0.001)/ 0.009	0.92 (0.75-1.13) 84.3% (p<0.001)/ 0.022	0.99 (0.93-1.02) 55.3% (p<0.05)/ 0.004	0.98 (0.83-1.16) 73.8% (p<0.01)/ 0.025				
help-seeking	lifetime		0.93* (0.87-0.99) 73.9% (p<0.01)/ 0.004			0.94 (0.88-1.00) 72.6% (p<0.01)/				
	present	0.77* (0.65-0.93) 90.8% (p<0.001)/ 0.037	0.64* (0.53-0.79) 85.6% (p<0.001)/ 0.049	0.84* (0.75-0.94) 29.1% (ns)/ 0.005	1.00 (0.96-1.05) 22.7% (ns)/ 0.001	0.98 (0.84-1.15) 68.5% (p<0.01)/ 0.023				
insurance	private	0.80 (0.61-1.04) 94.5% (p<0.001)/ 0.069	0.78* (0.68-0.89) 85.7% (p<0.001)/ 0.023	0.91 (0.77-1.07) 85.6% (p<0.001)/ 0.020	0.99 (0.93-1.06) 60.3% (p<0.05)/ 0.005	0.98 (0.84-1.15) 68.5% (p<0.01)/ 0.023				
	state-involved	0.87 (0.73-1.03) 56.2% (ns)/ 0.010	0.82* (0.70-0.96) 92.3% (p<0.001)/ 0.019	0.77* (0.61-0.96) 0% (ns) / 0.000	0.94* (0.90-0.99) 40.9% (ns)/ 0.001					
setting	interview		0.56* (0.40-0.77) 65.2% (p<0.05)/ 0.060	0.77* (0.60-0.98) 47.7% (ns)/ 0.025	0.96 (0.82-1.12) 62.7% (ns)/ 0.010	0.95 (0.71-1.28) 67.6% (p<0.05)/ 0.068				
	questionnaire	0.77* (0.65-0.93) 90.8% (p<0.001)/ 0.037	0.87* (0.80-0.94) 85.7% (p<0.001)/ 0.010	0.98 (0.81-1.18) 89.2% (p<0.001)/ 0.017	0.98 (0.94-1.03) 51.6% (p<0.05)/ 0.002	1.03* (1.01-1.05) 0% (ns)/ 0.000				
survey period	before 2006		0.79* (0.69-0.92) 91.5% (p<0.001)/ 0.021	0.77* (0.60-0.98) 47.7% (ns)/ 0.025	0.97 (0.94-1.01) 0% (ns)/ 0.000	0.82 (0.62-1.07) 0% (ns)/ 0.000				
	2006 or later	0.80* (0.66-0.97) 92.6% (p<0.001)/ 0.045	0.79* (0.69-0.92) 86.2% (p<0.001)/ 0.026	0.98 (0.81-1.18) 89.2% (p<0.001)/ 0.017	0.98 (0.91-1.05) 71.0% (p<0.001)/ 0.006	1.03 (0.86-1.25) 80.4% (p<0.01)/ 0.026				



DS5 output stratification (*continued*)

	personal stigma		help-seeking attitudes		self-stigma		perceived public stigma		general stigma	
Stratified by	OR (95%CI)	$I^2$ (p-value) / $\tau^2$	OR (95%CI)	$I^2$ (p-value) / $\tau^2$	OR (95%CI)	$I^2$ (p-value) / $\tau^2$	OR (95%CI)	$I^2$ (p-value) / $\tau^2$	OR (95%CI)	$I^2$ (p-value) / $\tau^2$
response rate										
≥ 70%			0.65* (0.50-0.84)	89.5% (p<0.001)/ <i>0.072</i>	0.66 (0.34-1.28)	62% (ns)/ <i>0.021</i>	0.96 (0.91-1.02)	0% (ns)/ <i>0.000</i>	0.98 (0.77-1.24)	66.2% (p<0.05)/ <i>0.051</i>
< 70%	0.77* (0.65-0.93)	90.8% (p<0.001)/ <i>0.037</i>	0.83* (0.71-0.96)	92.9% (p<0.001)/ <i>0.021</i>	0.86* (0.77-0.96)	25.4% (ns)/ <i>0.003</i>	0.99 (0.94-1.04)	66.8% (p<0.01)/ <i>0.003</i>		
not reported			0.92 (0.77-1.10)	76.0% (p<0.05)/ <i>0.016</i>	1.07 (1.01-1.14)	0% (ns) / <i>0.000</i>	0.94 (0.70-1.26)	79.5% (p<0.01)/ <i>0.044</i>		
quality of reporting										
< 25 stars	0.86* (0.80-0.93)	30.3% (ns)/ <i>0.002</i>	0.76* (0.64-0.90)	90.8% (p<0.001)/ <i>0.038</i>	0.91 (0.78-1.07)	82.0% (p<0.001)/ <i>0.019</i>	0.88 (0.74-1.04)	59.0% (ns)/ <i>0.014</i>	1.07 (0.49-2.31)	88.6% (p<0.01)/ <i>0.277</i>
≥ 25 stars	0.78 (0.53-1.13)	94.7% (p<0.001)/ <i>0.107</i>	0.90* (0.83-0.97)	72.8% (p<0.01)/ <i>0.005</i>			0.99 (0.95-1.04)	60.2% (p<0.05)/ <i>0.003</i>	0.96 (0.83-1.11)	60.9% (p<0.05)/ <i>0.013</i>
design										
cross-sectional	0.74* (0.61-0.90)	92.4% (p<0.001)/ <i>0.037</i>	0.82* (0.75-0.90)	90.2% (p<0.01)/ <i>0.016</i>	0.88 (0.76-1.03)	81.2% (p<0.001)/ <i>0.020</i>	0.96 (0.92-1.01)	63.6% (p<0.01)/ <i>0.003</i>	0.96 (0.83-1.16)	73.8% (p<0.01)/ <i>0.025</i>
prospective	1.07 (0.91-1.25)	15.5% (ns)/ <i>0.002</i>	0.55* (0.35-0.87)	40.5% (ns)/ <i>0.061</i>			1.02 (0.96-1.10)	0% (ns)/ <i>0.000</i>		

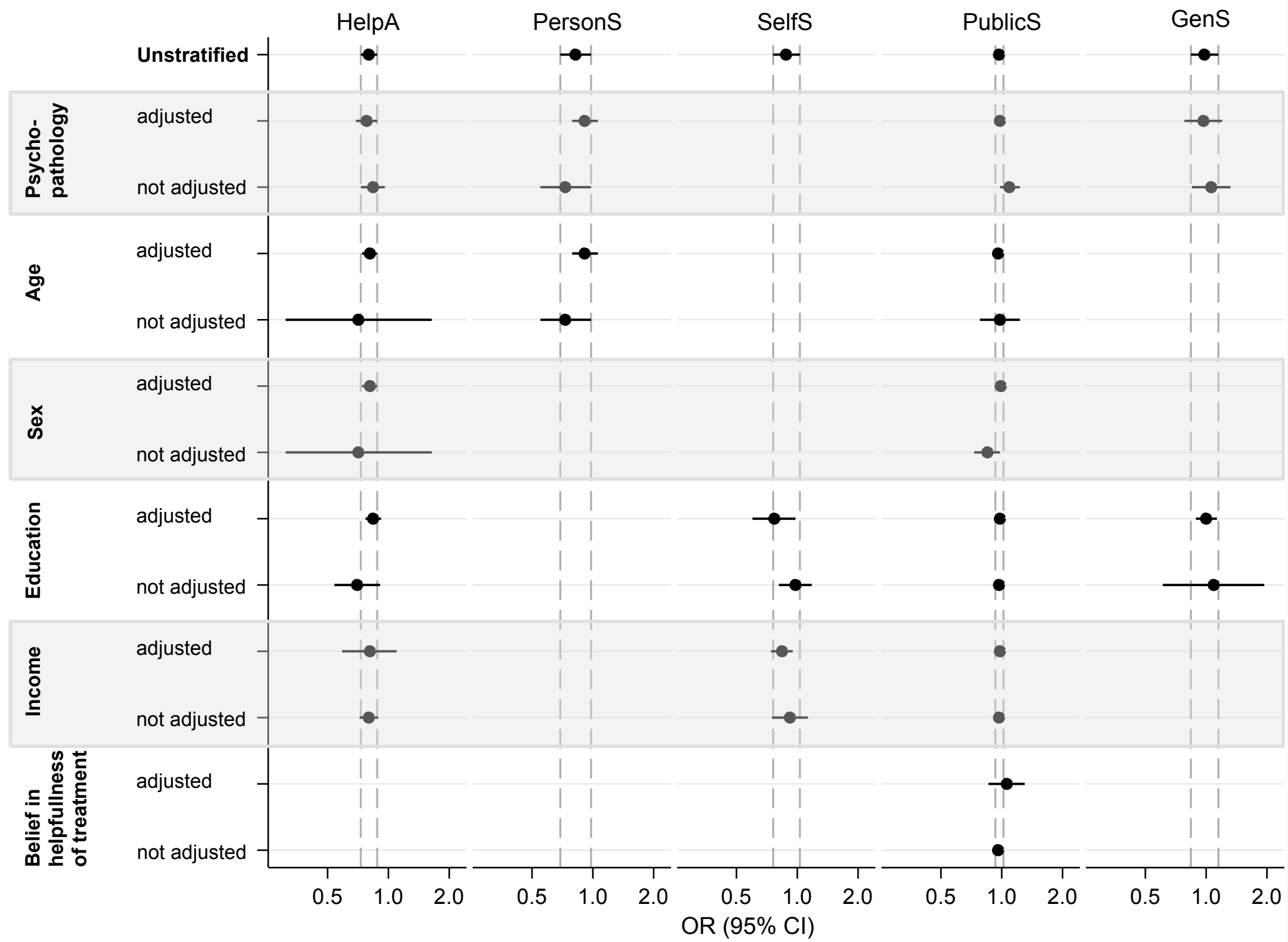
empty cells indicate that stratification was not possible due to small number of studies in this group ( $\leq 1$  study);  $I^2$  between study heterogeneity; ns= no statistically significant between study heterogeneity;  $\tau^2$  between study variance, written in *italics* in the table; \* = significant effect size



stigma measure	bias (regression slope)	p-value
HelpA	-3.355	< 0.01
PersonS	1.439	0.767
SelfS	-1.429	0.294
PublicS	0.566	0.510
GenS	-0.425	0.633

HelpA: help-seeking attitude, PersonS: personal stigma, SelfS: self-stigma, PublicS: perceived public stigma, GenS: general stigma.

Fig. DS1



**Fig. DS2**

Forest plot of the results of stratified meta-analyses of five stigma types on active hep-seeking.

Pooled estimates (Odds Ratio, OR) and 95% confidence interval (CI) of each strata are reported.

Dashed lines represent 95% CI of non-stratified analyses (top row). Abbreviations: HelpA: help-seeking attitude; PersonS: personal stigma; SelfS: self-stigma; PublicS: perceived public stigma; GenS: general stigma.  $OR < 1$  indicates negative associations between stigma or attitudes and help-seeking, i.e. higher levels of stigma are associated with less help-seeking.

Table DS1 Study characteristics

Source	time period	country	participants (total N study/n analyzed)	study design	method of data collection	stigma type	Cronbach's $\alpha$ stigma measure <sup>b</sup>	help-seeking	regression adjusted for
Jorm <i>et al</i> (2000) <sup>67</sup>	1996	Australia	randomly selected general population sample (3109/422)	prospective (6 month)	questionnaire	PersonS	0.84	recent <sup>a</sup>	
Mojtabai <i>et al</i> (2002) <sup>73</sup>	1990-1992	USA	randomly selected general population sample (1792/1792)	cross-sectional	interview	HelpA		recent <sup>a</sup>	psychopathology
Smith <i>et al</i> (2004) <sup>77</sup>		USA	rural adults selected from comprehensive white page listing (438/393)	cross-sectional	questionnaire	HelpA	0.88	lifetime	age, gender, education
Thoits (2005) <sup>79</sup>	1990-1992	USA	randomly selected general population sample (5877/1712)	cross-sectional	interview	(a) HelpA (b) SelfS		recent <sup>a</sup>	age, gender, education, income, relationship, ethnicity, urbanity, psychopathology, perceived need
Bambauer & Prigerson (2006) <sup>57</sup>	1999-2003	USA	unbiased and comprehensive sample of bereaved older adults (265/135)	cross-sectional	interview	(a) GenS (b) PublicS (c) SelfS	(a) 0.64 (b) 0.69 (c) 0.45	recent <sup>a</sup>	age, gender, education, psychopathology
Judd <i>et al</i> (2006) <sup>68</sup>		Australia	randomly selected general population sample (467/350)	cross-sectional	questionnaire	(a) PublicS (b) HelpA		lifetime	age, gender, education, relationship, physical health, psychopathology
Komiti <i>et al</i> (2006) <sup>70</sup>		Australia	randomly selected general population sample (300/267)	cross-sectional	questionnaire	(a) PublicS (b) HelpA	(a) 0.84 (b) 0.85	lifetime	age, gender, education, income, relationship, physical health, psychopathology, belief in helpfulness of treatment
Nadeem <i>et al</i> (2007) <sup>74</sup>	1997-2001	USA	low-income women from women entering care (15383/129)	cross-sectional	interview	GenS		recent <sup>a</sup>	age, education, relationship, ethnicity
Elhai <i>et al</i> (2008) <sup>60</sup>	2005	USA	representative student sample (297/296)	cross-sectional	questionnaire	HelpA	0.82	lifetime	age, gender, education, relationship, ethnicity
Golberstein <i>et al</i> (2008) <sup>62</sup>	2005	USA	randomly selected general population sample (2782/302)	cross-sectional	questionnaire	PublicS	0.74	recent <sup>a</sup>	age, gender, income, ethnicity, psychopathology
Golberstein <i>et al</i> (2009) <sup>63</sup>	2007	USA	randomly selected general population sample (732/726)	prospective (24 month)	questionnaire	PublicS	0.74	recent <sup>a</sup>	age, gender, income, ethnicity, psychopathology
Rusch <i>et al</i> (2008) <sup>76</sup>		USA	low income African American adults recruited from a large nonprofit organization (92/92)	cross-sectional	questionnaire	(a) PublicS (b) HelpA (c) SelfS	(a) 0.80 (b) 0.78 (c) 0.93	lifetime	psychopathology
Eisenberg <i>et al</i> (2009) <sup>33</sup>	2007	USA	randomly selected general population sample (5555/5555)	cross-sectional	questionnaire	(a) PublicS (b) PersonS	(a) 0.89 (b) 0.78	recent <sup>a</sup>	gender, ethnicity

Table DS1 Study characteristics (continued)

Menke <i>et al</i> (2009) <sup>71</sup>		USA	primary care patients (1013/1013)	cross-sectional	questionnaire	GenS	0.84	recent <sup>a</sup>	gender, education, ethnicity, psychopathology
Nyunt <i>et al</i> (2009) <sup>75</sup>	2003	Singapore	randomly selected general population sample of older adults (1092/1092)	cross-sectional	interview	SelfS		recent <sup>a</sup>	age, gender, education, income, employment status, relationship, ethnicity, psychopathology, perceived need, self management, previous service use, belief in helpfulness of treatment
Interian <i>et al</i> (2010) <sup>65</sup>	2007-2008	USA	primary care patients from two large clinics for underserved population (200/200)	prospective (5 month)	interview	(a) PublicS (b) HelpA (c) PersonS	(a) 0.69 (b) 0.71 (c) 0.75	lifetime	age, gender, education, relationship, insurance, psychopathology
ten Have <i>et al</i> (2010) <sup>78</sup>	2001-2003	Europe	randomly selected general population sample (21425/8796)	cross-sectional	interview	SelfS		recent <sup>a</sup>	age, gender, education, income, employment status, relationship, urbanity, psychopathology, previous service use, familiarity with mental illness
Aromaa <i>et al</i> (2011) <sup>58</sup>		Finland	randomly selected general population sample (5160/507)	cross-sectional	questionnaire	(a) HelpA (b) PersonS	(a) 0.42 (b) 0.70	recent <sup>a</sup>	age, gender, psychopathology
Kim <i>et al</i> (2011) <sup>69</sup>	2008-2009	USA	military personnel (3380/3380)	cross-sectional	questionnaire	(a) GenS (b) HelpA	(a) 0.93 (b) 0.83	recent <sup>a</sup>	age, gender, education
Downs & Eisenberg (2012) <sup>59</sup>	2009	USA	randomly selected students sample (8487/519)	cross-sectional	questionnaire	(a) PublicS (b) PersonS	(a) 0.83 (b) 0.73	recent <sup>a</sup>	gender, ethnicity, social support, belief in helpfulness of treatment, familiarity with mental illness
Green <i>et al</i> (2012) <sup>64</sup>		Australia	randomly selected general population sample (2639/124)	cross-sectional	interview	PublicS	0.80	lifetime	age, urbanity, psychopathology
Elnitsky <i>et al</i> (2013) <sup>61</sup>	2009-2010	USA	military personnel (799/799)	cross-sectional	interview	GenS	0.84	recent <sup>a</sup>	age, gender, employment status, relationship, ethnicity, psychopathology
Mojtabai & Crum (2013) <sup>72</sup>	2001-2002	USA	randomly selected general population sample (43093/195)	prospective (24-48 month)	interview	(a) GenS (b) HelpA		recent <sup>a</sup>	age, gender, ethnicity, insurance, psychopathology
Vogt <i>et al</i> (2014) <sup>80</sup>	2007-2009	USA	randomly selected military personnel (640/601)	cross-sectional	questionnaire	(a) PublicS (b) SelfS (c) PersonS (d) HelpA	0.84-0.93 <sup>c</sup>	recent <sup>a</sup>	age, gender, relationship, ethnicity, psychopathology, social desirability
Adler <i>et al</i> (2015) <sup>16</sup>	2011-2012	UK	military personnel (529/160)	prospective (8 month)	questionnaire	(a) PublicS (b) HelpA	(a) 0.96 (b) 0.90	recent <sup>a</sup>	age, gender, self-management
Blais <i>et al</i> (2015) <sup>56</sup>	2011	USA	randomly selected military personnel (2025/2025)	cross-sectional	interview	(a) GenS (b) HelpA <sup>d</sup>		recent <sup>a</sup>	age, gender, relationship, ethnicity, physical health, psychopathology, belief in helpfulness of treatment
Jennings <i>et al</i> (2015) <sup>66</sup>		USA	students recruited from an online research participation pool (246/95)	cross-sectional	questionnaire	(a) SelfS (b) PublicS	(a) 0.89 (b) 0.83	recent <sup>a</sup>	age, gender, self-management

GenS, general stigma; HelpA, attitudes towards help-seeking; PersonS, personal stigma; PublicS, public stigma; SelfS, self-stigma.

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## Association between mental health-related stigma and active help-seeking: systematic review and meta-analysis

Nina Schnyder, Radoslaw Panczak, Nicola Groth and Frauke Schultze-Lutter

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# Psychological Medicine

## Influence of knowledge about causes of mental disorders and stigma related to mental disorders on healthcare utilisation in a general population sample: a structural equation model

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Abstract:	<p>Background: The stigma of mental illness, especially personal attitudes towards psychiatric patients and mental health help-seeking, is an important barrier in healthcare utilisation. These attitudes are not independent of each other and are also influenced by other factors, such as mental health literacy, especially the public's causal explanations for mental problems. We aimed to disentangle the interrelations between the different aspects of stigma and causal explanations with respect to their influence on healthcare utilisation. Methods: Stigma and causal explanations were assessed using established German questionnaires with two unlabelled vignettes (schizophrenia and depression) in a random-selection representative community sample (N=1375, aged 16-40 years). They were interviewed through a prior telephone survey for current mental disorder (n=192) and lifetime healthcare utilisation (n=377). Structural equation modelling, with healthcare utilisation as outcome and stigma and causal explanations as latent variables, was conducted and supplemented by sensitivity analysis of the final model based on the vignettes. Results: We identified two major pathways. One stimulated healthcare utilisation, with high psychosocial stress and low constitution/personality related causal explanations, via positive perception of help-seeking and more help-seeking intentions. The other impeded healthcare utilisation, with high biogenetic and constitution/personality, and low psychosocial stress related explanations, via negative perception of psychiatric patients and a strong wish for social distance. Sensitivity analysis generally supported both pathways with some differences in the role of biogenetic causal explanation. Conclusion: Our results indicate that campaigns promoting early healthcare utilisation should focus on different strategies to promote facilitation and reduce barriers to mental healthcare.</p>



# **Influence of knowledge about causes of mental disorders and stigma related to mental disorders on healthcare utilisation in a general population sample: a structural equation model**

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## Abstract

**Background:** The stigma of mental illness, especially personal attitudes towards psychiatric patients and mental health help-seeking, is an important barrier in healthcare utilisation. These attitudes are not independent of each other and are also influenced by other factors, such as mental health literacy, especially the public's causal explanations for mental problems. We aimed to disentangle the interrelations between the different aspects of stigma and causal explanations with respect to their influence on healthcare utilisation. **Methods:** Stigma and causal explanations were assessed using established German questionnaires with two unlabelled vignettes (schizophrenia and depression) in a random-selection representative community sample (N=1375, aged 16-40 years). They were interviewed through a prior telephone survey for current mental disorder (n=192) and lifetime healthcare utilisation (n=377). Structural equation modelling, with healthcare utilisation as outcome and stigma and causal explanations as latent variables, was conducted and supplemented by sensitivity analysis of the final model based on the vignettes. **Results:** We identified two major pathways. One stimulated healthcare utilisation, with high psychosocial stress and low constitution/personality related causal explanations, via positive perception of help-seeking and more help-seeking intentions. The other impeded healthcare utilisation, with high biogenetic and constitution/personality, and low psychosocial stress related explanations, via negative perception of psychiatric patients and a strong wish for social distance. Sensitivity analysis generally supported both pathways with some differences in the role of biogenetic causal explanation. **Conclusion:** Our results indicate that campaigns promoting early healthcare utilisation should focus on different strategies to promote facilitation and reduce barriers to mental healthcare.

## Introduction

Mental disorders are prevalent and cause significant personal and societal costs and burdens (Whiteford *et al.*, 2013; Gustavsson *et al.*, 2011; Wittchen *et al.*, 2011). One reason is the often delayed or absent help-seeking (Wang *et al.*, 2007; Penttilä *et al.*, 2014), although mental disorders are treatable and potentially preventable (Barrera *et al.*, 2009; Bienvenu *et al.*, 2009; Waddell *et al.*, 2007). Of the several reported structural and personal barriers towards help-seeking for mental disorders (Andrade *et al.*, 2014; Bonabi *et al.*, 2015; Clement *et al.*, 2015; Corrigan *et al.*, 2014; Schomerus & Angermeyer, 2008; Thornicroft, 2008; Gulliver *et al.*, 2010), low perceived need for help (Kanehara *et al.* 2015), the desire to handle the problem on one's own (Andrade *et al.*, 2014), and negative, stigmatising attitudes are important (Clement *et al.*, 2015; Schnyder *et al.*, 2017).

The term "stigma" comprises public and personal attitudes and behavioural responses towards people with mental problems and towards help-seeking for mental disorders that are formed by cognition and affect (Dividio *et al.* 2010; Fiske, 1998). A recent meta-analysis identified two aspects of mental disorder-related stigma associated specifically with healthcare utilisation in the general population: personal attitudes towards individuals with mental disorders (PersonS) and attitudes towards mental health help-seeking (HelpA) (Schnyder *et al.*, 2017). Both these attitudes consist of a cognitive-behavioural and cognitive-affective component differentially related to help-seeking. The cognitive-behavioural aspect of PersonS is often measured as a wish for social distance from persons with a mental disorder (WSD) (Link *et al.*, 1999), whereas the cognitive-affective aspect of PersonS is often measured as perceived dangerousness of persons with mental disorder (Link *et al.*, 1999; Jorm *et al.*, 2012). WSD consistently showed negative associations with help-seeking (Interian *et al.*, 2010; Aromaa *et al.*, 2011), while cognitive-affective aspects including perceived dangerousness did not show direct associations with help-seeking (Cooper *et al.*, 2003; Schomerus *et al.*, 2009) but mediated the former relationship (Lee *et al.*, 2014). The cognitive-affective aspect of HelpA includes assumed feelings such as embarrassment about one's own (potential) help-seeking or what others might think about one's own (potential) help-seeking for mental problems (ten Have *et al.*, 2010). The cognitive-behavioural aspect of HelpA includes help-seeking intentions and people's willingness to seek help in case of mental problems (Picco *et al.* 2016; ten Have *et al.*, 2010). Similar to PersonS and in line with the theory of planned behaviour (Ajzen, 1991), the cognitive-behavioural, but not the cognitive-affective aspect of HelpA, was related to help-seeking behaviour (Mojtabai *et al.*, 2016; McEachan *et al.*, 2011).

Stigmatising attitudes, however, are not independent of each other and are also influenced by other factors, an important one being mental health literacy (MHL) (Svensson & Hansson, 2016). MHL is defined as knowledge about mental disorders, including etiological and help-seeking knowledge (Jorm *et al.*, 1997; Wei *et al.*, 2015). The public's causal explanations for mental health problems as part of MHL were associated with stigmatising attitudes toward individuals with mental disorders (Reavley & Jorm, 2014). Of these, biogenetic causal explanations were repeatedly related to more stigmatisation in terms of perceived dangerousness that, in turn, increased WSD (Schomerus *et al.*, 2014; Kvaale *et al.*, 2013). At present, little is known about how the various effects of stigma, biogenetic, and other causal explanations are interrelated with respect to their influence on healthcare utilisation for mental problems. Furthermore, to the best of our knowledge, studies of the interrelations between causal explanations and help-seeking attitudes, and help-seeking intentions and healthcare utilisation are still missing.

We aimed to disentangle the interrelations between the various aspects of stigma and causal explanation, as possibly the most influential aspect of MHL on stigma. Finally, we examined the influence of MHL and stigma on healthcare utilisation for mental problems, using structural equation modelling (SEM). This enabled us to account for potential correlations and associations between these constructs (Coppens *et al.*, 2013). A better understanding of the interplay among these variables will advance the development of combined information and anti-stigma campaigns. This would help overcome the two important barriers to adequate and timely mental health help-seeking (Corrigan *et al.*, 2015; Griffiths *et al.*, 2014; Mehta *et al.*, 2015; Thornicroft *et al.*, 2016).

## **Method**

### *Study design*

Our study is based on the cross-sectional data of an add-on to the 'Bern Epidemiological At-Risk' (BEAR) study, a random-selection representative population telephone study in the semi-rural Canton Bern, Switzerland (Schultze-Lutter *et al.*, 2014). Between June 2011 and June 2015, we recruited participants between 16-40 years. We chose this age range because most axis-I mental disorders have their onset after 15 and before 41 years (Kessler *et al.*, 2005). Besides appropriate age, eligibility criteria were main residency in Canton Bern (i.e. having a valid address in Canton Bern, and not abroad during the assessment period) and an available telephone number. Exclusion criteria included past or present psychosis, and

insufficient language skills in German, French, English, or Spanish. To increase response rate, we sent an information letter prior to the first telephone contact with study details and goals.

After each interview, we asked German-speaking participants to enrol in the add-on study and complete a questionnaire on MHL and attitudes. The questionnaires focussed on either depression or schizophrenia and were randomly posted in turn. To increase response rate, we reminded participants thrice to complete the questionnaire and offered help in case of difficulties.

The ethics committee at the University of Bern approved the studies. All participants gave informed consent for both studies.

### *Measures*

In the telephone interview, we assessed socio-demographic variables and lifetime healthcare utilisation with the WHO Pathways-to-Care questionnaire (Gater *et al.*, 1991), and axis-I disorders with the Mini-International Neuropsychiatric Interview (M.I.N.I.; Sheehan *et al.*, 1998).

Adapted from Angermeyer *et al.* (2004), the questionnaire of the add-on study started with an unlabelled vignette (see appendix to Angermeyer *et al.* 2004) on either schizophrenia or major depression referred to in subsequent questions. For assessment of causal explanations, participants were asked to rate the 18 causes on a five-point Likert scale from 0='certainly not a cause' to 4='certainly a cause'. For assessment of the cognitive-affective aspect of PersonS, participants were asked to rate 11 stereotyping attributes about the described person on a five-point Likert scale from 0='certainly not agree with' to 4='certainly agree with'. For assessment of the cognitive-behavioural aspect of PersonS, participants were asked to rate their willingness to engage in seven social relationships with the described person (adapted social distance scale developed by Link *et al.*, 1987) on a five-point Likert scale from 0='definitely willing' to 4='definitely not willing'. Higher values on the PersonS scales indicated stronger stigmatising attitudes. The cognitive-affective aspect of HelpA was assessed based on the response of the participants to the following two questions: 'how comfortable would you feel talking with a specialist about your personal problems' (four-point Likert scale from 0='not at all comfortable' to 3='very comfortable') and 'how embarrassed would you feel if your friends knew that you seek help for an emotional problem' (four-point Likert scale from 0='very embarrassed' to 3='not at all embarrassed'). We assessed the cognitive-behavioural aspect of HelpA (i.e., help-seeking intentions) based on the participants willingness to seek help from a specialist for an emotional problem (four-

point Likert scale from 0='definitely not' to 3='definitely yes'). For both HelpA concepts higher values indicate positive HelpA.

### *Statistical Analyses*

For group comparisons of categorical or non-normally distributed continuous data, we computed  $\chi^2$ -tests or Mann-Whitney U tests, respectively. Prior to the structural equation models (SEM), we computed orthogonal exploratory factor analyses (EFA) with varimax rotation on the basis of polychoric correlation matrices for participant's causal explanations and PersonS, to obtain independent factors. We computed SEMs with the weighted least squares and variance adjusted estimator (WLSMV) (Brown, 2006) based on diagonally weighted least squares (DWLS) for categorical variables (Muthén, 1993). Missing data were deleted listwise. We assessed the model fit with four commonly used indices that were as follows: the  $\chi^2$  test, the comparative fit index (CFI), the standardized root mean square residual (SRMR), and the root-mean-square error of approximation (RMSEA) including 90%-confidence interval (90%CI). A non-significant  $\chi^2$ -test,  $CFI \geq 0.95$ ,  $SRMR \leq 0.08$ , and  $RMSEA \leq 0.06$  (90%CI should not contain 0.08) indicated good model fit (Kline, 2011; Hooper *et al.* 2008). In the evaluation of model fit, we focussed on CFI, SRMR, and RMSEA, because the  $\chi^2$ -test is sensitive to sample size resulting usually in a rejected model in large samples such as ours (Bentler & Bonnet, 1980).

We formed latent variables for causal explanations and for PersonS according to results of the EFA, and for the cognitive-affective aspect of HelpA 'not embarrassing/feeling comfortable', to generate the measurement models. Help-seeking intentions and lifetime healthcare utilisation were observed variables. Following recommendations for confirmatory factor analysis (Acock, 2013), we dropped items with factor loadings  $\leq 0.4$  from the analyses. We computed all parameters based on standardisation of latent and manifest variables.

We first tested the hypothesised base model including all likely associations between latent and manifest variables (eFigure 1). Then we dropped latent variables with non-significant associations as well as other non-significant associations from the model. For sensitivity analysis, we analysed the final model in the two subgroups (depression and schizophrenia vignette) separately. Finally, we included socio-demographic variables and axis-I disorder potentially confounding healthcare utilisation. Statistical analyses were done using Stata version 14 (Stata Corporation, College Station, TX, USA) and R (R Core Team) package lavaan (Rosseel, 2012).

## Results

### *Sample characteristics*

Of the 2683 representative participants of the telephone study, 2519 spoke German. Of these eligible participants, 1519 returned the questionnaire; thus, the response rate was 60.3% (Figure 1). There was no indication of a response bias related to the vignette, presence of any current mental disorder, or lifetime healthcare utilisation for mental problems. However, non-responders were mostly young males with a low education level. All response biases had a small effect size (eTable 1).

- Figure 1 -

Of the responders, 377 (24.8%) reported lifetime healthcare utilisation for mental problems in the telephone survey (Table 1). Healthcare utilisers were more likely older, educated females, currently meeting the criteria for a non-psychotic mental disorder (Table 1).

- Table 1 -

### *Factors of causal explanations and stigmatising attributes*

EFA of the 18 causal explanations resulted in five independent factors: ‘psychosocial stress’, ‘childhood adversities’, ‘biogenetics’, ‘substance abuse’, and ‘constitution/personality’ (eTable 2). ‘Psychosocial stress’ was the main causal explanation for the depicted symptoms, followed by ‘substance abuse’, ‘biogenetics’, ‘childhood adversities’, and ‘constitution/personality’ (eTable 2).

EFA of the 18 items on PersonS led to four independent factors as follows: ‘perceived unpredictability/dangerousness’, ‘wish for social distance’ (WSD), ‘dependent’, and ‘needy’ (eTable 3). Further analyses only considered ‘perceived unpredictability/dangerousness’ and WSD due to their dominance in prior studies (Link *et al.*, 2004). Participants mostly attributed unpredictability to a person with a mental disorder and expressed the strongest WSD with respect to child-care and job-recommendation (eTable 3).

Most participants expressed high help-seeking intentions, i.e. they would likely or certainly seek help in case of mental problems (eFigure 2). Participants anticipated generally feeling comfortable talking to a professional about potential mental problems, and not feeling embarrassed if others knew about the assumed help-seeking (factor ‘pleasant/not embarrassing’) (eFigure 2).

*Associations between causal explanations and attitudes and their influence on healthcare utilisation*

Little missing data (between 0.2-1.2% per item) resulted in 10% missing data in total, using the list wise deletion method. The initial model showed a good fit, and most hypothesised stigmatising attitudes and associations became significant (eFigure 3). No significant associations were found between causal explanations related to substance abuse or childhood adversity and ‘perceived unpredictability/dangerousness’ or ‘pleasant/not embarrassing’, and between WSD and help-seeking intentions (eFigure 3). Consequently, we dropped these two latent variables from the model and removed non-significant associations.

The final resultant SEM had a good model fit and indicated two main paths from causal explanations via attitudes to healthcare utilisation (Figure 2, Table 2). One path, increasing healthcare utilisation, led from high psychosocial stress and low constitution/personality related causal explanations via perceiving help-seeking as pleasant/not embarrassing and help-seeking intentions to more likely healthcare utilisation. The other path, decreasing healthcare utilisation, led from high biogenetic as well as constitution/personality and low psychosocial stress related causal explanations via strongly perceived unpredictability/dangerousness and a strong WSD to less likely healthcare utilisation. Furthermore, a perception of unpredictability/dangerousness increased help-seeking intentions, whereas a perception of help-seeking as pleasant/not embarrassing was decreased by a stronger WSD (Figure 2).

*- Figure 2 -*

*- Table 2 -*

*Sensitivity analyses and influence of sociodemographic and clinical variable*

The sensitivity analyses of the influence of the vignettes revealed models of comparable good fit. They differed slightly, especially with respect to the role of biogenetic causal explanations (Figure 3). These played no significant role in the depression–vignette model. However, compared to the general model, their influence on perceived unpredictability/dangerousness became more pronounced in the schizophrenia-vignette model. The two main paths of the general model remained generally stable for both vignettes; however, for the schizophrenia vignette the association between WSD and healthcare utilisation became non-significant.

*- Figure 3 -*



To control for potentially confounding variables of healthcare utilisation, we included socio-demographic and clinical variables in an extended SEM (eFigure 4). Although current axis-I disorder, female sex, and higher age were positively associated with healthcare utilisation and slightly increased the explained variance of healthcare utilisation, all paths of the general model (Figure 2) remained significant at a slightly decreased model fit.

## Discussion

Our unique, comprehensive community study on the pathways from causal explanations of mental disorders via attitudes towards mental disorders and help-seeking, and help-seeking intentions to healthcare utilisation provides important insights, thereby extending our knowledge on the interplay of previously reported single associations. We identified two major pathways, one that stimulates healthcare utilisation for mental problems and another that impedes it. These pathways are largely independent of the clinical picture illustrated in the two vignettes, as well as of sociodemographic variables and presence of a non-psychotic axis-I disorder.

The stimulating pathway went from high psychosocial stress and low constitution/personality related causal explanations via pleasant/not embarrassing perception of help-seeking, and high help-seeking intentions to an increased probability of healthcare utilisation. Help-seeking attitudes in general (incl. help-seeking intentions) had been related to healthcare utilisation earlier (Schnyder *et al.*, 2017); however, the role of causal explanations was unknown. Interestingly, biogenetic causal explanations that received a strong focus in stigma research, especially for their effect on the attitude towards persons with mental disorders (Kvaale *et al.*, 2013; Schomerus *et al.*, 2014), played no significant role in the stimulating pathway (Lee *et al.*, 2014). They only exhibited relatively small negative associations with stress- and constitution/personality-related causal explanations. They have been substituted by constitution/personality related causal explanations having a moderately negative impact on the perception of help-seeking as pleasant/not embarrassing. Jorm and Griffiths (2008) have also reported personal weakness (a main factor of our latent variable ‘constitution/personality’), as opposed to biogenetic causal explanation, to be an important determinant of stigmatising attitudes. In contrast, psychosocial stress-related causal explanations with a moderately positive association with constitution/personality related explanations had a minor positive effect on help-seeking attitudes. In line with the results of previous studies (Mojtabai *et al.*, 2016; McEachan *et al.*, 2011), perception of help-seeking as

pleasant/not embarrassing strongly stimulated help-seeking intentions, which moderately stimulated healthcare utilisation. The moderate path between intended help-seeking and healthcare utilisation supports the notion that intentions and behaviour are associated (Ajzen, 1991), but not the same. Although most people would recommend seeking help from a professional (Holzinger *et al.* 2011), a much lower proportion actually engaged in it (Wang *et al.*, 2007). Future studies should therefore distinguish between intended help-seeking and healthcare utilisation when examining impact of stigmatising attitudes on help-seeking, particularly if the focus is on promoting early help-seeking.

A surprising finding was the small positive effect of perceived unpredictability/dangerousness on help-seeking intentions. This association seems to depend on the strength of the perceived unpredictability/dangerousness and was only included in the sensitivity analyses for the schizophrenia vignette model (Angermeyer *et al.*, 2004). This counterintuitive finding might reflect persons' wish to prevent being stigmatised themselves by symptoms like the ones depicted in the vignette, thus voicing stronger intentions to seek help in case of their own potential mental problems. Further studies looking deeper into this possible link are required.

The impending pathway went from low psychosocial stress and high constitution/personality related causal explanations as well as biogenetic causal explanations via perceived unpredictability/dangerousness and high WSD to a decreased probability of healthcare utilisation. Earlier studies on the impact of causal explanations on stigma had often focussed on biogenetic causal explanations (Kvaale *et al.*, 2013), while other causal models received less attention. Interestingly, despite supporting a significant moderate role of biogenetic causal explanations, our results indicated a strong role of the commonly neglected psychosocial stress and constitution/personality related causal explanations on stigmatisation of persons with mental disorder. Altogether, our results on causal explanations indicate that causal models related to person factors increase perceived unpredictability/dangerousness while those related to stressful environmental factors decrease it. In line with the results of other studies (Lee *et al.*, 2014; Schomerus *et al.*, 2014), perceived unpredictability/dangerousness increased WSD. However, this had a minor negative effect on healthcare utilisation. A recent meta-analysis reported a slightly smaller effect of attitudes towards persons with mental disorder compared to attitudes towards help-seeking on healthcare utilisation in the general population (Schnyder *et al.*, 2017). Furthermore, the higher impact of help-seeking attitudes on healthcare utilisation supports earlier theories and findings of a strong association between the two (Ajzen, 1991; O'Connor *et al.*, 2014). In the

schizophrenia vignette model, this direct link between WSD and healthcare utilisation disappeared. This was surprising in light of the commonly reported greater link of WSD with schizophrenia compared to its link with depression (Angermeyer *et al.*, 2004); and therefore it was expected to exert a stronger impact on healthcare utilisation.

Contrary to our expectations, we did not find a direct association between WSD and help-seeking intention. However, WSD had a negative impact on the stimulating pathway because of the perception of help-seeking as potentially embarrassing/unpleasant. Other studies have shown negative effects of WSD on help-seeking intentions (Schomerus *et al.*, 2009; Yap *et al.*, 2011). However, to the best of our knowledge, our study was the first to differentially assess this relationship in one model together with the perception of help-seeking as potentially embarrassing/unpleasant as a moderator of help-seeking intentions.

The presence of the two largely independent pathways from causal models via stigmatising attitudes to healthcare utilisation, if replicated in future studies, is relevant to the planning of campaigns promoting early healthcare utilisation. These could focus on reducing barriers to healthcare, promoting facilitators of health care utilisation, or both, by differential strategies. In both cases, however, childhood adversity and substance use related causal explanations seem to play a negligible role on stigma-related barriers to healthcare utilisation, at least not in cases of schizophrenia and depression. Our results indicate that these pathways, albeit sharing many features, do differ in some respects. Thus, future studies might further address the question of similarities and differences with respect to different mental disorders; this will improve the focus on common links in general campaigns and address specific features, related to specific risk groups, in special campaigns.

### *Strengths and limitations*

Despite the two obvious strengths of our study: (1) examining various relevant associations of the pathway from causal models via stigmatising attitudes to healthcare utilisation in one study, and (2) using healthcare utilisation, rather than only hypothetical help-seeking intentions, as an outcome in a randomly selected, representative community sample, some limitations have to be considered. One of the limitations our study shares with other studies (Clement *et al.*, 2015; Schnyder *et al.*, 2017) is its reliance on cross-sectional data of a high-income, Western society. We can therefore neither exclude the problem of reversed causation nor can we translate our findings to low-income or non-western societies. Another limitation shared with other studies (Eisenberg *et al.*, 2009; Nederhof, 1985) is the possibility of a

response bias towards social desirability. Future studies might use implicit association tests or direct behavioural observations.

In our sample, we detected a small response bias in favour of female sex, higher age, and higher education. Since only few studies have reported potential response biases (Gronholm *et al.*, 2017), we cannot estimate if other similar studies share these biases. However, they are frequently reported in general population studies (Cull *et al.*, 2005; Guyll *et al.*, 2003). Education, age, and sex had no significant impact on our outcome. Thus, these small biases are likely to be negligible.

### *Conclusion*

Our unique study indicated the presence of two largely independent pathways from causal models via stigmatising attitudes to healthcare utilisation. The stimulating pathway included help-seeking attitudes, the impeding pathway included attitudes towards persons with mental disorder. Interestingly, in both pathways, biogenetic causal models played only a minor role, indicating that other causal explanations should be considered equally in future studies. In line with the theory of planned behaviour (Ajzen, 1991, Ajzen, 2001), future studies should distinguish between help-seeking intentions and healthcare utilisation. They might additionally take past behaviours (e.g. past treatment) into account when examining influencing factors such as attitudes and causal explanations. Furthermore, our sensitivity analyses indicated that, while mental disorders share certain crucial features in attitude-related barriers and facilitators, they might also be associated with distinct features that could be relevant for disorder-specific campaigns.

**Figure and table legends** (writing in *italics* for tables are not to be printed, they just serve as information for the typesetter)

**Figure 1:** Survey outcome rates of the Bern Epidemiological At Risk (BEAR) telephone and its add-on questionnaire study according to the definitions of the American Association for Public Opinion Research (Ref: Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 9th edition. The American Association for Public Opinion Research. AAPOR; 2016. [http://www.aapor.org/AAPOR\\_Main/media/publications/Standard-Definitions20169theditionfinal.pdf](http://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf). Accessed May 20, 2017)

**Figure 2:** Final model of associations between causal explanations, stigmatising attitudes and healthcare utilisation (n=1375).

Model fit indices:  $\chi^2_{(338)}=1731$ ,  $p<0.001$ ; CFI=0.966; SRMR=0.055; RMSEA=0.055 (90%CI=0.052-0.057).

\*\*\*  $p\leq 0.001$ ; standardised path coefficient and corresponding standard error (in parentheses); explained variance ( $R^2$ ) for each endogenous variable in *italics*. Rectangles represent observed manifest variables, ovals represent unobserved latent variables; rounded arrows represent covariances; straight arrows represent regressions. Bolt black arrows indicate paths that decreased healthcare utilisation, bolt grey arrows indicate paths that increased healthcare utilisation.

**Figure 3:** Final model of associations for depression and schizophrenia vignette separately.

\* $p\leq 0.05$  \*\*  $p\leq 0.01$ , \*\*\*  $p\leq 0.001$ ; standardised path coefficient and corresponding standard error (in parentheses); explained variance ( $R^2$ ) for each endogenous variable in *italics*. Rectangles represent observed manifest variables, ovals represent unobserved latent variables; rounded arrows represent covariances; solid straight arrows represent significant, dashed straight arrow represents non-significant regression. Results of two models are presented here: MFI,  $R^2$  and results of solid arrows relate to reduced model (non-significant paths dropped from model). Result of dashed arrow relates to full model.

*Title of table 1:*

**Table 1: Socio-demographic and clinical characteristics of sample**

*Legend of table 1:*

<sup>a</sup> according to International Standard Classification of Education (ISCED) (UNESCO Institute for Statistics, 2012).

371 <sup>b</sup> according to Mini-International Neuropsychiatric Interview.

372 <sup>c</sup> Cramer's *V* of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

373 <sup>e</sup> Pearson's *r* of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

374 <sup>\*</sup> cell frequency significantly higher or lower than expected with the standardised residuum of  
375 cell of >1.96 and of <-1.96, respectively.

376 Sum scores of different axis-I disorders do not add up to current axis-I disorder 'yes' due to  
377 comorbidity.

378

379 *Title of table 2*

380 **Table 2: Standardized factor loadings of latent variables from final model and their**  
381 **corresponding standard errors**

382 *Legend of table 2:*

383 <sup>a</sup> Reference indicator with fixed factor loadings in unstandardized solution

384 \*\*\*  $p \leq 0.001$

385

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## Literature

- Acock A** (2013). *Discovering Structural Equation Modeling Using Stata*. Stata Press: Texas.
- Ajzen I** (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes* **50**, 179-211.
- Ajzen I** (2001). Nature and operation of attitudes. *Annual review of psychology* **52**, 27-58.
- Andrade LH, Alonso J, Mneimneh Z, Wells JE, Al-Hamzawi A, Borges G, Bromet E, de Girolamo G, de Graaf R, Florescu S, Gureje O, Hinkov HR, Hu C, Huang Y, Hwang I, Jin R, Karam EG, Kovess-Masfety V, Levinson D, Matschinger H, O'Neill S, Posada-Villa J, Sagar R, Sampson NA, Sasu C, Stein DJ, Takeshima T, Viana MC, Xavier M, Kessler RC** (2014). Barriers to mental health treatment: results from the WHO World Mental Health surveys. *Psychological Medicine* **44**, 1303–17.
- Angermeyer MC, Matschinger H, Corrigan PW** (2004). Familiarity with mental illness and social distance from people with schizophrenia and major depression: testing a model using data from a representative population survey. *Schizophrenia Research* **69**, 175-182.
- Aromaa E, Tolvanen A, Tuulari J, Wahlbeck K** (2011). Personal stigma and use of mental health services among people with depression in a general population in Finland. *BMC Psychiatry* **11**, 52.
- Barrera AZ, Torres LD, Muñoz RF** (2007). Prevention of depression: the state of the science at the beginning of the 21st century. *International Review of Psychiatry* **19**, 655-670.
- Bentler PM, Bonnet DC** (1980) Significance Tests and Goodness of Fit in the Analysis of Covariance Structures. *Psychological Bulletin* **88**, 588-606.
- Bienvenu OJ, Ginsburg GS** (2007). Prevention of anxiety disorders. *International Review of Psychiatry* **19**, 647-654.
- Bonabi H, Müller M, Ajdacic-Gross V, Eisele J, Rodgers S, Seifritz E, Rössler W, Rüsch N** (2016) Mental Health Literacy, Attitudes to Help Seeking, and Perceived Need as Predictors of Mental Health Service Use: A Longitudinal Study. *The Journal of Nervous and Mental Disease*, **204**, 321–324.
- Brown TA** (2006). *Confirmatory factor analysis for applied researchers*. Guilford Press: New York, NY.
- Clement S, Schauman O, Graham T, Maggioni F, Evans-Lacko S, Bezborodovs N, Morgan C, Rüsch N, Brown JSL, Thornicroft G** (2015). What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychological Medicine* **45**, 11–27.



- Corrigan PW, Druss BG, Perlick DA** (2014). The impact of mental illness stigma on seeking and participating in mental health care. *Psychological Science in the Public Interest* **15**, 37–70.
- Corrigan PW, Michaels PJ, Morris S** (2015). Do the effects of antistigma programs persist over time? Findings from a meta-analysis. *Psychiatric Services* **66**, 543-546.
- Cooper AE, Corrigan, PW, Watson AC** (2003). Mental illness stigma and care seeking. *The Journal of Nervous and Mental Disease* **191**, 339-341.
- Coppens E, Van Audenhove C, Scheerder G, Arensman E, Coffey C, Costa S, Koburger N, Gottlebe K, Gusmão R, O'Connor R, Postuvan V, Sarchiapone M, Sisask M, Székely A, van der Feltz-Cornelis C, Hegerl U** (2013). Public attitudes toward depression and help-seeking in four European countries baseline survey prior to the OSPI-Europe intervention. *Journal of Affective Disorders* **150**, 320-329.
- Cull WL, O'Connor KG, Sharp S, Tang SFS** (2005). Response rates and response bias for 50 surveys of pediatricians. *Health Services Research* **40**, 213-226.
- Dividio JF, Hewstone M, Glick P, Esses VM** (2010). Prejudice, Stereotyping and Discrimination: Theoretical and Empirical Overview. In *The SAGE Handbook of Prejudice, Stereotyping and Discrimination* (ed. J. F. Dividio, M. Hewstone, P. Glick and V. M. Esses), pp. 3-28. SAGE: Newbury Park, CA.
- Eisenberg D, Downs MF, Golberstein E, Zivin K** (2009). Stigma and help seeking for mental health among college students. *Medical Care Research and Review*, 66(5), 522-541.
- Fiske ST** (1998). Stereotyping, prejudice, and discrimination. In *Handbook of Social Psychology* (ed. D. T. Gilbert, S. T. Fiske and G. Lindzey), pp. 357-411. McGraw-Hill: New York.
- Gater R, Sousa DBAE, Barrientos G, Caraveo J, Chandrashekar CR, Dhadphale M, Goldberg D, Al Kathiri AH, Mubbashar M, Silhan K, Thong D, Torres-Gonzales F, Sartorius N** (1991). The pathways to psychiatric care: a cross-cultural study. *Psychological Medicine* **21**, 761-774.
- Griffiths KM, Carron- Arthur B, Parsons A, Reid R** (2014). Effectiveness of programs for reducing the stigma associated with mental disorders. A meta- analysis of randomized controlled trials. *World Psychiatry* **13**, 161-175.
- Gronholm PC, Thornicroft G, Laurens KR, Evans-Lacko S** (2017). Mental health-related stigma and pathways to care for people at risk of psychotic disorders or experiencing first-episode psychosis: a systematic review. *Psychological Medicine* **47**, 1867-1879.

- Gulliver A, Griffiths KM, Christensen H** (2010). Perceived barriers and facilitators to mental health help-seeking in young people: a systematic review. *BMC Psychiatry* **10**, 113.
- Gustavsson A, Svensson M, Jacobi F, Allgulander C, Alonso J, Beghi E, Dodel R, Ekman M, Faravelli C, Fratiglioni L, Gannon B, Hilton Jones D, Jenum P, Jordanova A, Jönsson L, Karampampa K, Knapp M, Kobelt G, Kurth T, Lieb R, Linde M, Ljungcrantz C, Maercker A, Melin B, Moscarelli M, Musayev A, Norwood F, Preisig M, Pugliatti M, Rehm J, Salvador-Carulla L, Schlehofer B, Simon R, Steinhausen H-C, Stovner J, Vallat J-M, Van den Bergh P, van Os J, Vos P, Xu W, Wittchen H-U, Jönsson B, Olesen J, on behalf of the CDBE2010 study group** (2011). Cost of disorders of the brain in Europe 2010. *European Neuropsychopharmacology* **21**, 718–779.
- Guyll M, Spoth R, Redmond C** (2003). The effects of incentives and research requirements on participation rates for a community-based preventive intervention research study. *The Journal of Primary Prevention* **24**, 25-41.
- Holzinger A, Matschinger H, Angermeyer MC** (2011). What to do about depression? Help-seeking and treatment recommendations of the public. *Epidemiology and Psychiatric Sciences* **20**, 163-169.
- Hooper D, Coughlan J, Mullen M** (2008). Structural equation modelling: guidelines for determining model fit. *Electronic Journal of Business research Methods* **6**, 53-60.
- Interian A, Ang A, Gara MA, Link BG, Rodriguez MA, Vega WA** (2010). Stigma and depression treatment utilisation among Latinos: utility of four stigma measures. *Psychiatric Services* **61**, 373-379.
- Jorm AF, Griffiths KM** (2008). The public's stigmatizing attitudes towards people with mental disorders: how important are biomedical conceptualizations? *Acta Psychiatrica Scandinavica* **118**, 315-321.
- Jorm AF, Korten AE, Jacomb PA, Christensen H, Rodgers B, Pollitt P** (1997). Mental health literacy: a survey of the public's ability to recognise mental disorders and their beliefs about the effectiveness of treatment. *Medical Journal of Australia* **166**, 182-186.
- Jorm AF, Reavley NJ, Ross AM** (2012). Belief in the dangerousness of people with mental disorders: A review. *Australian & New Zealand Journal of Psychiatry* **46**, 1029-1045.
- Kanehara A, Umeda M, Kawakami N** (2015). Barriers to mental health care in Japan: Results from the World Mental Health Japan survey. *Psychiatry and Clinical Neurosciences* **69**, 523-533.

- Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE** (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry* **62**, 593-602.
- Kline RB** (2011). *Principles and practices of structural equation modelling*. Guilford: New York.
- Kvaale EP, Haslam N, Gottdiener WH** (2013). The ‘side effects’ of medicalization: A meta-analytic review of how biogenetic explanations affect stigma. *Clinical Psychology Review* **33**, 782-794.
- Lee AA, Laurent SM, Wykes TL, Andren KAK, Bourassa KA, McKibbin CL** (2014). Genetic attributions and mental illness diagnosis: effects on perceptions of danger, social distance, and real helping decisions. *Social Psychiatry and Psychiatric Epidemiology* **49**, 781-789.
- Link BG, Cullen FT, Frank J, Wozniak JF** (1987). The social rejection of former mental patients: Understanding why labels matter. *American Journal of Sociology* **92**, 1461-1500.
- Link BG, Yang LH, Phelan JC, Collins PY** (2004). Measuring mental illness stigma. *Schizophrenia Bulletin* **30**, 511-541.
- Link BG, Phelan JC, Bresnahan M, Stueve A, Pescosolido BA** (1999). Public conceptions of mental illness: labels, causes, dangerousness, and social distance. *American Journal of Public Health* **89**, 1328-1333.
- McEachan RRC, Conner M, Taylor NJ, Lawton RJ** (2011). Prospective prediction of health-related behaviours with the theory of planned behaviour: A meta-analysis. *Health Psychology Review* **5**, 97-144.
- Mehta N, Clement S, Marcus E, Stona AC, Bezborodovs N, Evans-Lacko S, Palacios J, Docherty M, Barley E, Rose D, Koschorke M, Shidhaye R, Henderson C, Thornicroft G** (2015). Evidence for effective interventions to reduce mental health-related stigma and discrimination in the medium and long term: systematic review. *The British Journal of Psychiatry* **207**, 377-384.
- Mojtabai R, Evans-Lacko S, Schomerus G, Thornicroft G** (2016). Attitudes toward mental health help seeking as predictors of future help-seeking behavior and use of mental health treatments. *Psychiatric Services* **67**, 650-657.
- Muthén BO** (1993). Goodness of fit with categorical and other nonnormal variables. In *Testing Structural Equation Models* (ed. K.A. Bollen, and J.S. Long), pp. 205-234. SAGE: Newbury Park, CA.
- Nederhof AJ** (1985). Methods of coping with social desirability bias: A review. *European*

525 *Journal of Social Psychology* **15**, 263-280.

526 **O'Connor PJ, Martin B, Weeks CS, Ong L** (2014). Factors that influence young people's  
527 mental health help- seeking behaviour: a study based on the Health Belief  
528 Model. *Journal of Advanced Nursing* **70**, 2577-2587.

529 **Penttilä M, Jääskeläinen E, Hirvonen N, Isohanni M, Miettunen J** (2014). Duration of  
530 untreated psychosis as predictor of long-term outcome in schizophrenia: systematic  
531 review and meta-analysis. *The British Journal of Psychiatry* **205**, 88-94.

532 **Picco L, Abdin E, Chong SA, Pang S, Shafie S, Chua BY, Vaingankar JA, Ong LP, Tay  
533 J, Subramaniam M** (2016). Attitudes toward seeking professional psychological help:  
534 factor structure and socio-demographic predictors. *Frontiers in psychology* **7**, 547.

535 **Reavley NJ, Jorm AF** (2014). Associations between beliefs about the causes of mental  
536 disorders and stigmatising attitudes: Results of a national survey of the Australian public.  
537 *Australian & New Zealand Journal of Psychiatry* **48**, 764–771.

538 **Rosseel Y** (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of*  
539 *Statistical Software* **48**, 1-36.

540 **Sheehan D, Lecrubier Y, Sheehan KH, Sheehan K, Amorim P, Janavs J, Weiller EHT,  
541 Hergueta T, Baker RDG, Dunbar GCL** (1998). Diagnostic Psychiatric Interview for  
542 DSM-IV and ICD-10. *Journal of Clinical Psychiatry* **59**, 22-33.

543 **Schnyder N, Panczak R, Groth N, Schultze-Lutter F** (2017). Association between mental  
544 health-related stigma and active help-seeking: systematic review and meta-analysis. *The*  
545 *British Journal of Psychiatry* **210**, 261-268.

546 **Schomerus G, Angermeyer MC** (2008). Stigma and its impact on help-seeking for mental  
547 disorders: What do we know? *Epidemiologia e Psichiatria Sociale* **17**, 31–37.

548 **Schomerus G, Matschinger H, Angermeyer MC** (2014). Causal beliefs of the public and  
549 social acceptance of persons with mental illness: a comparative analysis of schizophrenia,  
550 depression and alcohol dependence. *Psychological Medicine* **44**, 303-314.

551 **Schomerus G, Matschinger H, Angermeyer MC** (2009). The stigma of psychiatric  
552 treatment and help-seeking intentions for depression. *European Archives of Psychiatry*  
553 *and Clinical Neuroscience* **259**, 298-306.

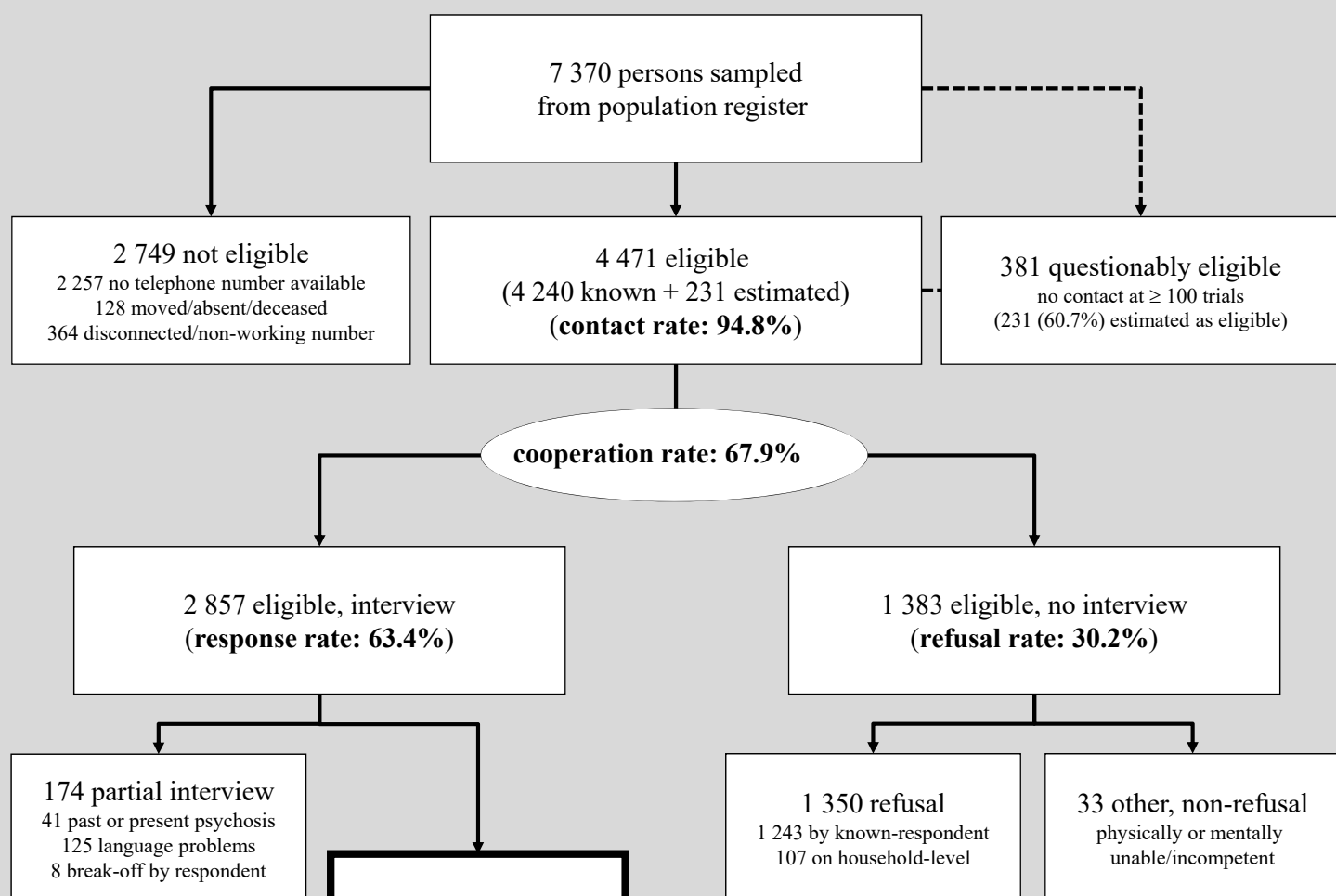
554 **Schultze-Lutter F, Michel C, Ruhrmann S, Schimmelmann BG** (2014). Prevalence and  
555 clinical significance of DSM-5–attenuated psychosis syndrome in adolescents and young  
556 adults in the general population: the Bern Epidemiological At-Risk (BEAR) study.  
557 *Schizophrenia Bulletin* **40**, 1499-1508.

- Svensson B, Hansson L** (2016). How mental health literacy and experience of mental illness relate to stigmatizing attitudes and social distance towards people with depression or psychosis: A cross-sectional study. *Nordic Journal of Psychiatry* **70**, 309-313.
- ten Have M, de Graaf R, Ormel J, Vilagut G, Kovess V, Alonso J, the ESEMeD/MHEDEA 2000 Investigators** (2010). Are attitudes towards mental health help-seeking associated with service use? Results from the European Study of Epidemiology of Mental Disorders. *Social Psychiatry and Psychiatric Epidemiology* **45**, 153-163.
- Thornicroft G** (2008). Stigma and discrimination limit access to mental health care. *Epidemiologia e Psichiatria Sociale* **17**, 14–19.
- Thornicroft G, Mehta N, Clement S, Evans-Lacko S, Doherty M, Rose D, Koschorke M, Shidhaye R, O'Reilly C, Henderson C** (2016). Evidence for effective interventions to reduce mental-health-related stigma and discrimination. *The Lancet* **387**, 1123-1132.
- UNESCO Institute for Statistics (UIS)** (2012). International Standard Classification of Education, ISCED 2011. UIS: Montreal.
- Waddell C, Hua JM, Garland OM, Peters RDeV, McEwan K** (2007). Preventing mental disorders in children: A systematic review to inform policy-making. *Canadian Journal of Public Health/Revue Canadienne de Sante'e Publique* **98**, 166-173.
- Wang PS, Angermeyer, M, Borges G, Bruffaerts R, Tat Chiu W, De Girolamo G, Fayyad J, Gureje O, Haro JM, Huang Y, Kessler RC, Kovess V, Levinson D, Nakane Y, Oakley Brown MA, Ormel JH, Posada-Villa J, Aguilar-Gaxiola S, Alonso J, Lee S, Heeringa S, P B-E, Chatterji S, Üstüm TB on behalf of the WHO WORLD MENTAL HEALTH SURVEY CONSORTIUM** (2007). Delay and failure in treatment seeking after first onset of mental disorders in the World Health Organization's World Mental Health Survey Initiative. *World Psychiatry* **6**, 177–185.
- Wei Y, McGrath PJ, Hayden J, Kutcher S** (2015). Mental health literacy measures evaluating knowledge, attitudes and help-seeking: a scoping review. *BMC Psychiatry* **15**, 291-311.
- Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, Charlson FJ, Norman RE, Flaxman AD, Johns N, Burstein R, Murray CJL, Vos T** (2013). Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *Lancet* **382**, 1575–1586.
- Wittchen HU, Jacobi F, Rehm J, Gustavsson A, Svensson M, Jönsson B, olesen J, Allgulander C, Alonso J, Faravelli C, Fratiglioni L, Jenum P, Lieb R, Maercker A, van Os J, Preisig M, Salvador-Carulla L, Simon R, Steinhausen H-C** (2011). The size

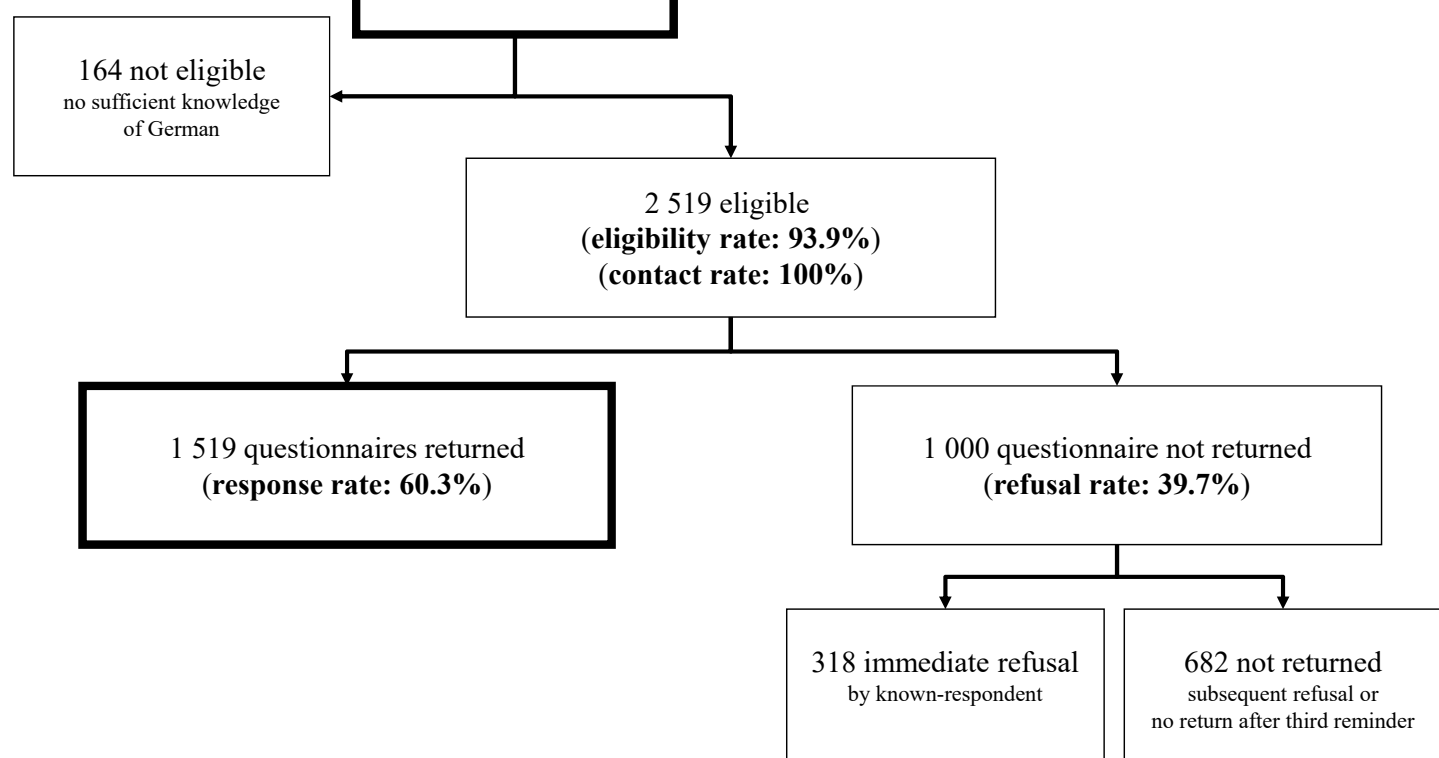
593 and burden of mental disorders and other disorders of the brain in Europe 2010.  
594 *European Neuropsychopharmacology* **21**, 655–679.

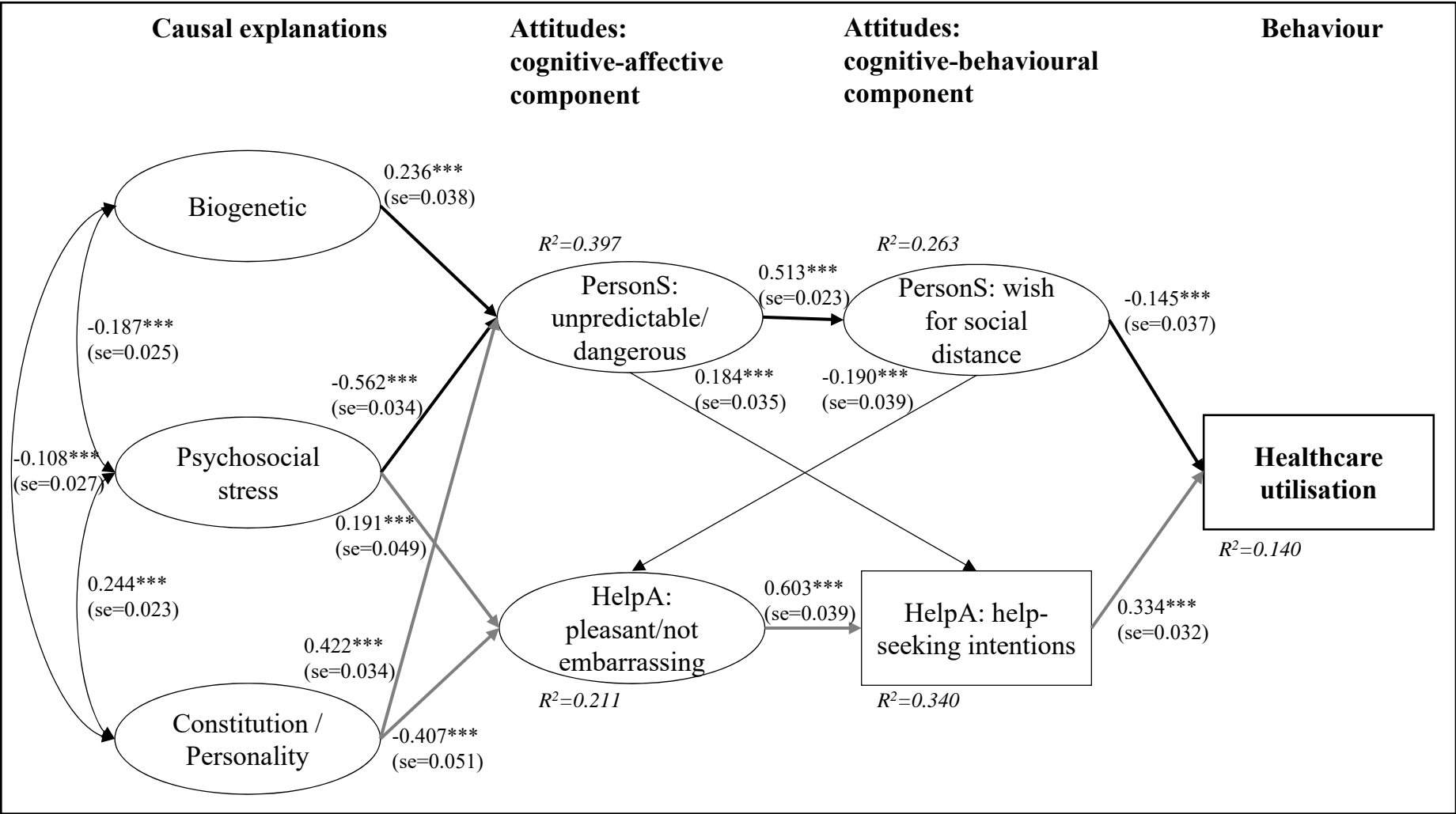
595 **Yap MB, Wright A, Jorm AF** (2011). The influence of stigma on young people's help-  
596 seeking intentions and beliefs about the helpfulness of various sources of help. *Social*  
597 *Psychiatry and Psychiatric Epidemiology* **46**, 1257-1265.

## BEAR telephone study

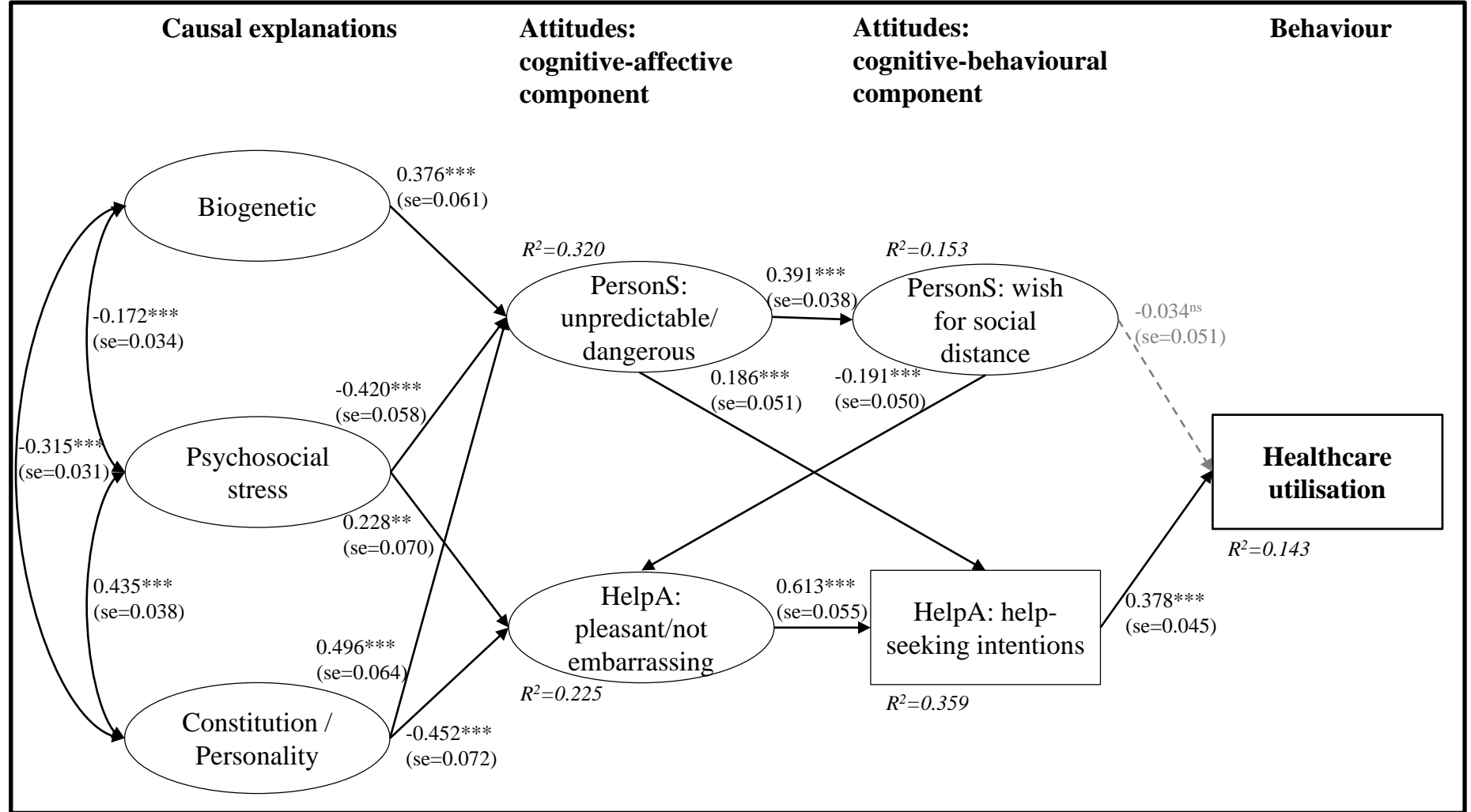
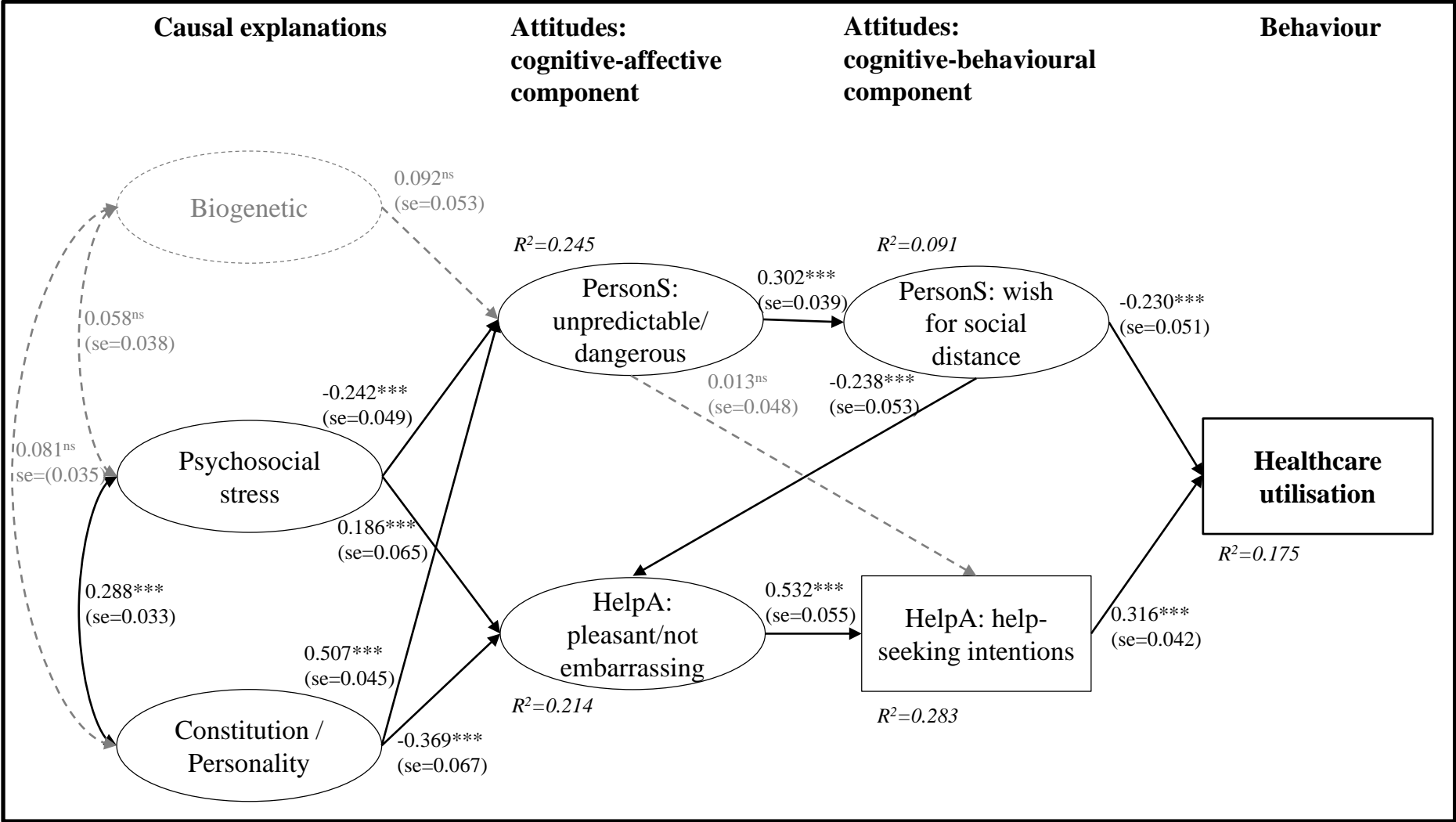


## Add-on questionnaire study









**Table 1: Socio-demographic and clinical characteristics of sample**

	Total sample (N=1519)	No lifetime healthcare utilisation (n=1142; 75.2%)	Lifetime healthcare utilisation (n=377; 24.8%)	Statistics $\chi^2_{(df)}$ and Cramer's $V^c$ / U ( $p$ ) and Pearson's $r^d$
Sex, n (%)				
Male	717 (47.2)	603 (52.8)*	114 (30.2)*	$\chi^2_{(1)}=57.900$ , $p<0.001$ , $V=0.195$
Female	802 (52.8)	539 (47.2)*	263 (69.8)*	
Age: median (mean $\pm$ SD)	33.9 (31.3 $\pm$ 7.3)	32.9 (30.8 $\pm$ 7.4)	35.3 (33.0 $\pm$ 6.6)	U=179 289.5, $p<0.001$ , $r=0.125$
Highest professional qualification <sup>a</sup> , n (%)				
Secondary school (ISCED 2)	42 (2.8)	30 (2.6)	12 (3.2)	$\chi^2_{(6)}=14.126$ , $p<0.05$ , $V=0.096$
High School (ISCED 3)	98 (6.4)	83 (7.3)	15 (4.0)*	
Post-secondary non-tertiary education (ISCED 4)	13 (0.9)	9 (0.8)	4 (1.1)	
Short cycle tertiary education (ISCED 5)	794 (52.3)	590 (51.7)	204 (54.1)	
Master (ISCED 7)	548 (36.1)	417 (36.5)	131 (34.7)	
Doctoral (ISCED 8)	24 (1.6)	13 (1.1)	11 (2.9)*	
Current axis-I disorder <sup>b</sup> , n (%)				
No	1327 (87.4)	1044 (91.4)	283 (75.1)*	$\chi^2_{(1)}=68.635$ , $p<0.001$ , $V=0.213$
Yes	192 (12.6)	98 (8.6)*	94 (24.9)*	
Any affective disorder	60 (3.9)	14 (1.2)	46 (12.2)*	$\chi^2_{(1)}=89.996$ , $p<0.001$ , $V=0.243$
Any anxiety disorder	138 (9.1)	84 (7.4)	54 (14.3)*	$\chi^2_{(1)}=16.662$ , $p<0.001$ , $V=0.105$
Any eating disorder	7 (0.5)	2 (0.2)	5 (1.3)*	$\chi^2_{(1)}=8.188$ , $p<0.01$ , $V=0.073$
Any somatoform disorder	15 (1.0)	4 (0.4)*	11 (2.9)*	$\chi^2_{(1)}=19.110$ , $p<0.001$ , $V=0.112$
Alcohol misuse	18 (1.2)	8 (0.7)	10 (2.7)*	$\chi^2_{(1)}=9.223$ , $p<0.01$ , $V=0.078$
Drug misuse	22 (1.4)	13 (1.1)	9 (2.4)	$\chi^2_{(1)}=3.097$ , $p=0.078$ , $V=0.045$

<sup>a</sup> according to International Standard Classification of Education (ISCED) (UNESCO Institute for Statistics, 2012).

<sup>b</sup> according to Mini-International Neuropsychiatric Interview.

<sup>c</sup> Cramer's  $V$  of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

<sup>e</sup> Pearson's  $r$  of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

\* cell frequency significantly higher or lower than expected with the standardised residuum of cell of  $>1.96$  and of  $<-1.96$ , respectively.

Note: sum scores of different axis-I disorders do not add up to current axis-I disorder 'yes' due to comorbidity.

**Table 2: Standardized factor loadings of latent variables from final model and their corresponding standard errors**

Latent Variable <i>Item</i>	Standardized factor loadings	Standard error
<b>Causal explanations</b>		
Psychosocial Stress		
<i>Work-related stress</i>	0.846***	0.016
<i>Problems or sorrows in family</i>	0.705***	0.019
<i>Too high self-expectations</i>	0.647***	0.021
<i>Severe life event</i>	0.523***	0.025
<i>Daily hustles</i>	0.640***	0.021
Biogenetic		
<i>Brain disease<sup>a</sup></i>	1.116***	0.127
<i>Heredity</i>	0.364***	0.046
Constitution/Personality		
<i>Weak will</i>	0.771***	0.027
<i>Weak constitution</i>	0.531***	0.027
<i>Immoral lifestyle</i>	0.539***	0.028
<b>Personal Stigma (PersonS)</b>		
Cognitive-behavioural aspect (Wish for social distance)		
<i>Babysit your children for a couple of hours<sup>a</sup></i>	0.764***	0.019
<i>Sublet a room in your apartment</i>	0.748***	0.015
<i>Accept as a co-worker</i>	0.640***	0.019
<i>Accept as a neighbour</i>	0.789***	0.014
<i>Agree on marrying into your family</i>	0.726***	0.016
<i>Introduce to a friend</i>	0.697***	0.017
<i>Recommend for a job</i>	0.675***	0.018
Cognitive-affective aspect (Unpredictable/Dangerous)		
<i>Aggressive<sup>a</sup></i>	0.646***	0.018
<i>Unpredictable</i>	0.698***	0.017
<i>Lacking self-control</i>	0.737***	0.015
<i>Unreasonable</i>	0.531***	0.022
<i>Strange and different</i>	0.741***	0.015
<i>Frightening</i>	0.684***	0.018
<i>Dangerous</i>	0.788***	0.014
<b>Help-seeking attitudes (HelpA)</b>		
Cognitive-affective aspect		
<i>How comfortable<sup>a</sup></i>	0.552***	0.034
<i>How embarrassed</i>	0.627***	0.036

<sup>a</sup> Reference indicator with fixed factor loadings in unstandardized solution

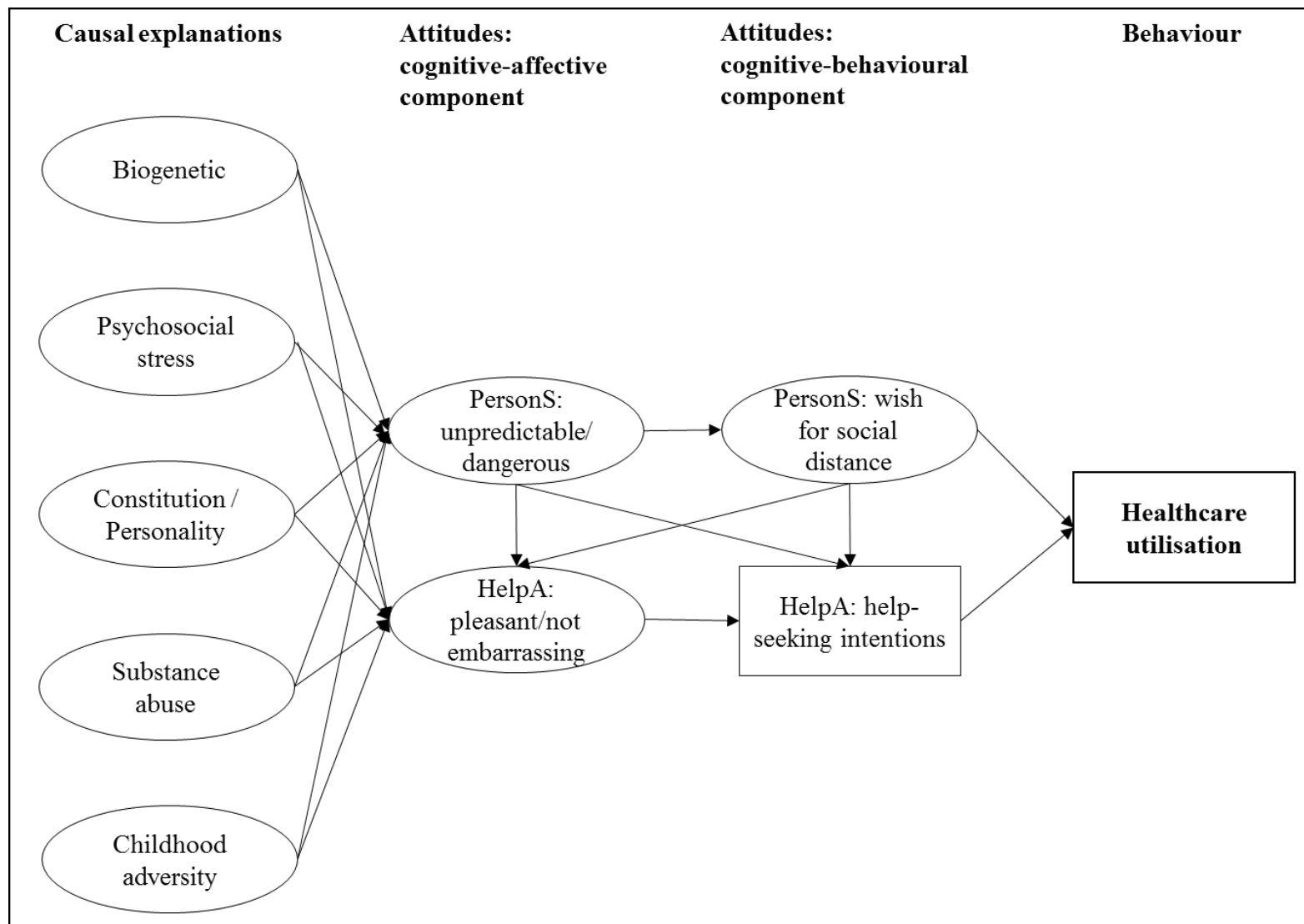
\*\*\* p≤0.001

**Supplementary Material to:**  
**Influence of knowledge about causes of mental disorders and stigma related to mental disorders on healthcare utilisation in a general population sample: a structural equation model**

Schnyder, N.<sup>1</sup>, Michel, C.<sup>1</sup>, Panczak, R.<sup>2</sup>, Ochsenbein, S.<sup>1</sup>, Schimmelmann, B.G.<sup>1,3</sup>, Schultze-Lutter, F.<sup>1,4</sup>

**Content: 4 eFigures, 3 eTables**

- eFigure 1: proposed model derived from theory and according to explorative factor analysis.
- eTable 1: response bias of questionnaire
- eTable 2: Results of the explorative factor analysis (EFA) of the 18 causal explanations and their frequencies (n=1391).
- eTable 3: Results of the explorative factor analysis (EFA) of the 11 stigmatising attributes (cognitive-affective aspect of personal stigma (PersonS)) and of the 7 social situations (cognitive-behavioural aspects of PersonS) and their frequencies (n=1452).
- eFigure 2: Frequencies of help-seeking attitudes (HelpA).
- eFigure 3: Results of the hypothesized base model derived from theory and according to explorative factor analysis (n=1354).
- eFigure 4: final model with potentially confounding sociodemographic variables (n=1375).



**Figure 1:** proposed model derived from theory and according to explorative factor analysis.

Note: rectangles represent observed variables, ovals represent unobserved latent variables

**eTable 1:** response bias of questionnaire

	Responder (n=1519; 69.3%)	Non-responder (n=682; 30.7%)	Statistics $\chi^2_{(df)}$ and Cramer's $V^c$ / U ( $p$ ) and $r^d$
Vignette, n (%)			
Depression	750 (49.3)	349 (51.2)	$\chi^2_{(1)}=0.677$ , $p=0.410$ $V=0.018$
Schizophrenia	769 (50.7)	333 (48.8)	
Sex, n (%)			
Male	718 (47.2)*	423 (62.0)*	$\chi^2_{(1)}=41.227$ , $p<0.001$ $V=0.137$
Female	801 (52.8)*	259 (38.0)*	
Age: median (mean $\pm$ SD)	33.9 (31.3 $\pm$ 7.3)	32.0 (30.3 $\pm$ 7.5)	U=479 772.5, $p<0.01$ , $r=0.060$
Highest professional qualification <sup>a</sup> , n (%)			
Secondary school (ISCED 2)	42 (2.8)*	43 (6.3)*	$\chi^2_{(7)}=57.599$ , $p<0.001$ $V=0.162$
High School (ISCED 3)	98 (6.5)	53 (7.8)	
Post-secondary non-tertiary education (ISCED 4)	13 (0.9)	4 (0.6)	
Short cycle tertiary education (ISCED 5)	794 (52.3)	416 (61.0)*	
Master (ISCED 7)	548 (36.1)*	159 (23.3)*	
Doctoral (ISCED 8)	24 (1.6)	7 (1.0)	
Current axis-I disorder <sup>b</sup> , n (%)			
No	1326 (87.3)	587 (86.1)	$\chi^2_{(1)}=0.629$ , $p=0.428$ $V=0.017$
Yes	193 (12.7)	95 (13.9)	
Lifetime help-seeking			
No	1142 (75.2)	537 (78.7)	$\chi^2_{(1)}=3.293$ , $p=0.070$ $V=0.039$
Yes	377 (24.8)	145 (21.3)	

<sup>a</sup> according to International Standard Classification of Education (ISCED) (UNESCO Institute for Statistics, 2012).

<sup>b</sup> according to Mini-International Neuropsychiatric Interview.

<sup>c</sup> Cramer's  $V$  of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

<sup>d</sup> Pearson's  $r$  of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

\* cell frequency significantly higher or lower than expected with the standardised residuum of cell of  $>1.96$  and of  $<-1.96$ , respectively.

**eTable 2:** Results of the explorative factor analysis (EFA) of the 18 causal explanations<sup>a</sup> and their frequencies (n=1391)

Items	% rated as agree <sup>b</sup> to a cause	% rated as disagree <sup>c</sup> to a cause	Factor 1: <b>Psychosocial stress</b>	Factor 2: <b>Childhood adversity</b>	Factor 3: <b>Substance abuse</b>	Factor 4: <b>Constitution /Personality</b>	Factor 5: <b>Biogenetics</b>
Little support others	40	24		0.458			
Grown up in a broken home	35	33		0.826			
Brain disease	52	24					0.510
Problems or sorrows in family	68	10	0.723				
God's will	4	90				0.538 <sup>d</sup>	
Spoiling or over-protective parents	10	64		0.603			
Weak constitution	46	22				0.649	
Immoral lifestyle	13	61				0.629	
Medication or drug abuse	66	13			0.855		
Weak will	22	53				0.758	
Too high self-expectation	52	23	0.721				
Alcohol abuse	46	25			0.827		
Heredity	45	29					0.770
Unconscious conflict	49	20	0.489 <sup>d</sup>				
Severe or very stressful life event	77	7	0.629				
Daily hustles	54	20	0.682				
Lack of parental affection	30	34		0.791			
Work-related stress	68	10	0.836				
<b>Eigenvalue</b>			3.117	2.085	2.057	1.974	1.432

Results are from varimax rotated orthogonal EFA based on polychoric correlation matrices; factor loadings of items (in cells) are only shown for the corresponding factor.

<sup>a</sup> Each cause had to be rated on a five-point Likert scale from 0='certainly not a cause' to 4='certainly a cause'.

<sup>b</sup> Percentage refers to persons that 'agreed' or 'totally agreed' with the cause.

<sup>c</sup> Percentage refers to persons that 'disagreed' or 'totally disagreed' with the cause.

<sup>d</sup> variables were dropped in structural equation model (SEM) due to their low factor loadings ( $\leq 0.4$ ) in SEM.

**eTable 3:** Results of the explorative factor analysis (EFA) of the 11 stigmatising attributes<sup>a</sup> (cognitive-affective aspect of personal stigma (PersonS)) and of the 7 social situations<sup>b</sup> (cognitive-behavioural aspects of PersonS) and their frequencies (n=1452)

Items	% of not willing <sup>b</sup> , or agree with <sup>c</sup>	% willing, or disagree with <sup>c</sup>	Factor 1: <b>Wish for social distance, WSD</b>	Factor 2: <b>Unpredictable/ dangerous</b>	Factor 3: <b>Dependent</b>	Factor 4: <b>Needy</b>
<i>PersonS: cognitive-behavioural aspect</i>						
Sublet a room in your apartment	46	19	0.736			
Accept as your co-worker	13	62	0.692			
Accept as your neighbour	13	60	0.762			
Babysit your children for some hours	81	6	0.728			
Agree on marrying into your family	30	35	0.755			
Introduce to a friend	21	50	0.754			
Recommend for a job	47	19	0.781			
<i>PersonS: cognitive-affective aspect</i>						
In need of help	85	4				0.829
Unpredictable	47	27		0.771		
Lacking self-control	31	41		0.806		
Aggressive	14	62		0.783		
Unreasonable	27	47		0.526		
Dependent on others	45	26			0.546	
Strange and different	38	36		0.569		
Frightening	31	46		0.626		
Dangerous	13	64		0.746		
Dependent	35	37			0.803	
Unintelligible	23	51			0.685	
<b>Eigenvalue</b>			4.137	3.697	1.962	1.280

Results are from varimax rotated orthogonal EFA based on polychoric correlation matrices; factor loadings of items (in cells) are only shown for the corresponding factor.

<sup>a</sup> Each attribute had to be rated on a five-point Likert scale from 0='totally disagree with' to 4='totally agree with'.

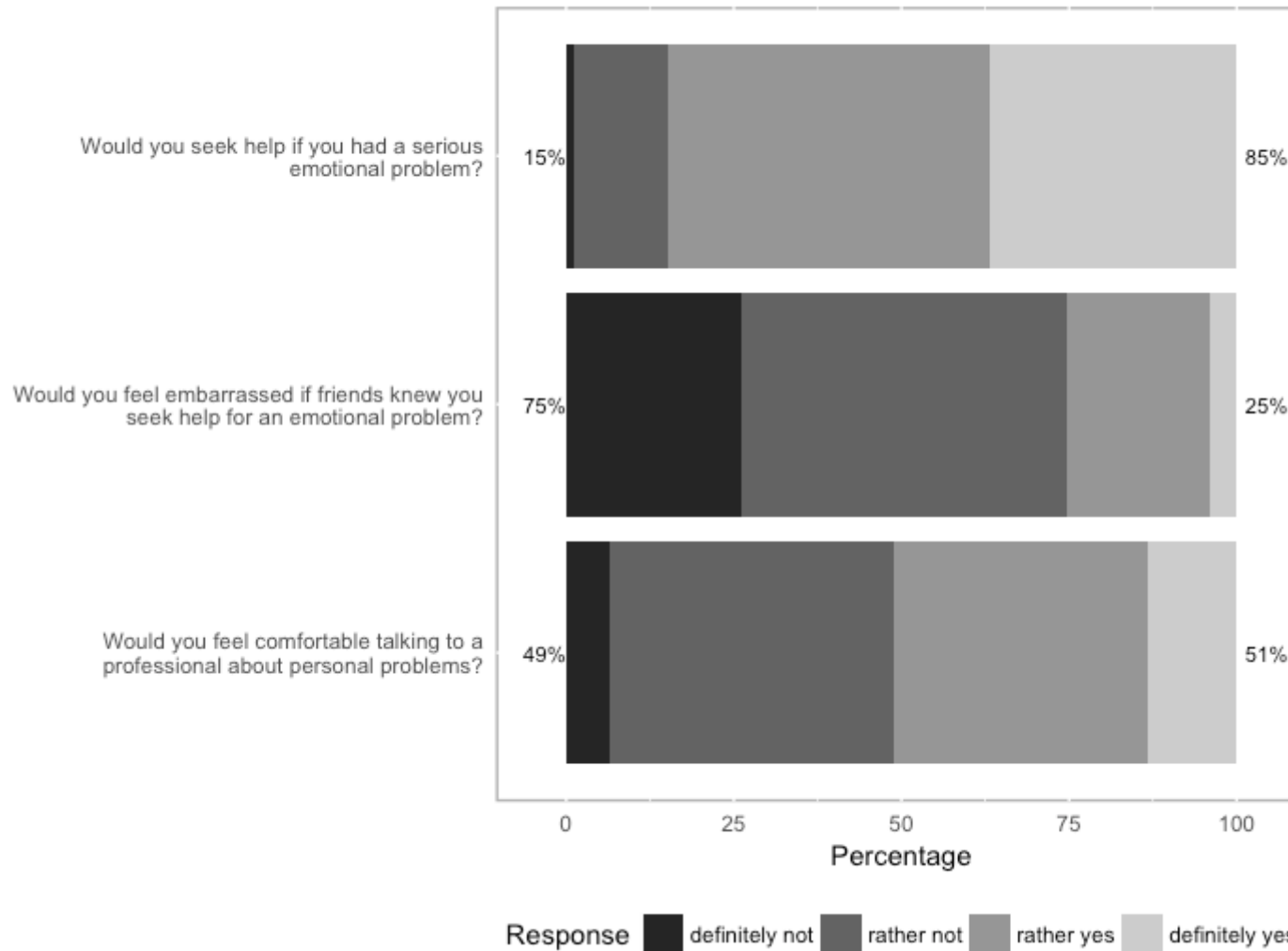
<sup>b</sup> Each of the social situations had to be rated on a five-point Likert scale from 0='definitely willing' to 4='definitely not willing'.

<sup>c</sup> Percentages refer to 'rather not willing' or 'not willing' (WSD) and to 'agree' or 'totally agree' with (stigmatising attributes).

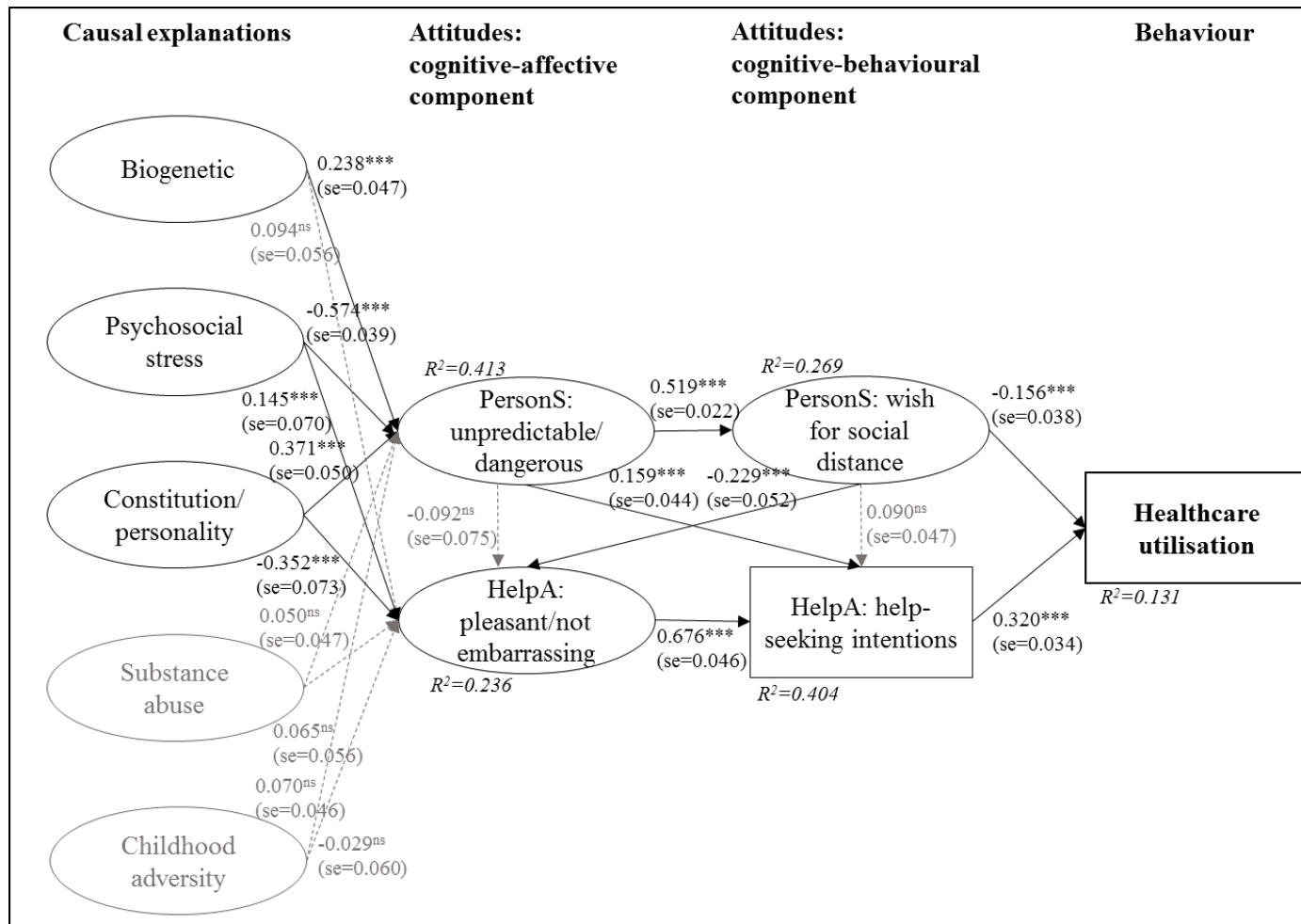
<sup>d</sup> Percentages refer to 'willing' or 'definitely willing' (WSD) and to 'disagree' or 'totally disagree' with (stigmatising attributes).



### Help-Seeking Attitudes



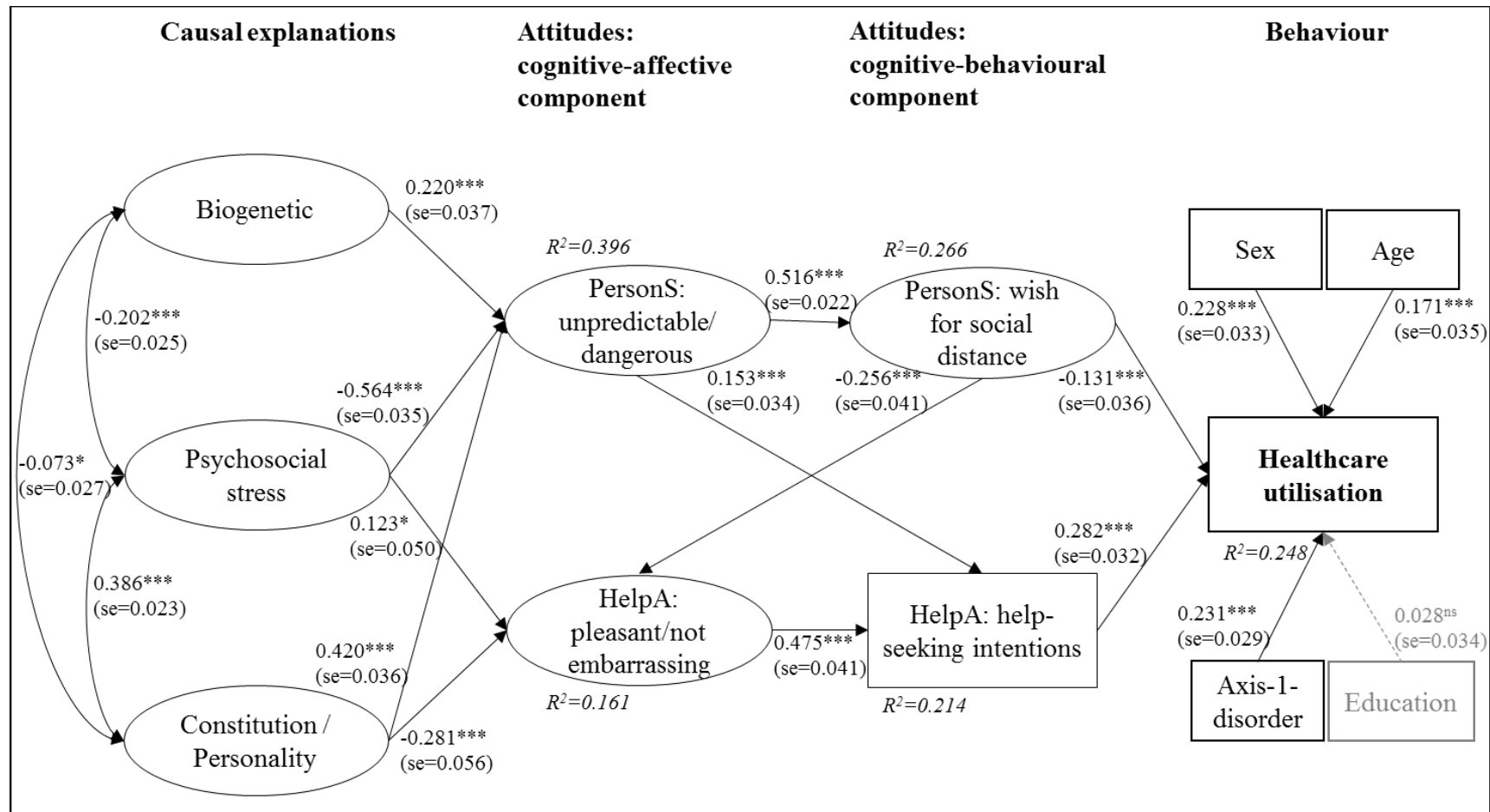
**eFigure 2:** Frequencies of help-seeking attitudes (HelpA). Percentages on the left side of the graph refer to 'definitely not' and 'rather not', while percentages on the right refer to 'rather yes' or 'definitely yes'



**eFigure 3:** Results of the hypothesized base model derived from theory and according to explorative factor analysis (n=1354).

Model fit indices:  $\chi^2_{(501)}=2626$ ,  $p<0.001$ ; CFI=0.957; SRMR=0.057; RMSEA=0.056 (90% CI=0.054-0.058)

Note: \*  $p\leq 0.05$ , \*\*  $p\leq 0.01$ , \*\*\* $p\leq 0.001$ ; standardised path coefficient and corresponding standard error (in parentheses); explained variance ( $R^2$ ) for each endogenous variable in *italics*. Rectangles represent observed variables, ovals represent unobserved latent variables; solid arrows represent significant, dashed arrows represent non-significant regressions.



**eFigure 4:** final model with potentially confounding sociodemographic variables (n=1375).

Model fit indices:  $\chi^2_{(419)}=2242$ ,  $p<0.001$ ; CFI=0.957; SRMR=0.052; RMSEA=0.056 (90%CI=0.054-0.059)

Note: \*\*  $p \leq 0.05$ , \*\*\*  $p \leq 0.01$ , \*\*\*\*  $p \leq 0.001$ ; standardised path coefficient and corresponding standard error (in parentheses); explained variance ( $R^2$ ) for each endogenous variable in *italics*. Rectangles represent observed manifest variables, ovals represent unobserved latent variables; rounded arrows represent covariances; solid straight arrows represent significant, dashed straight arrows represent non-significant regressions. Results of two models are presented here: MFI,  $R^2$  and results of solid arrows relate to reduced model (non-significant paths dropped from model). Result of dashed arrow relates to full model.